VOL. XL. No. 7 JULY 1955

MECCANO MAGAZINE

S.S. "SOUTHERN CROSS"

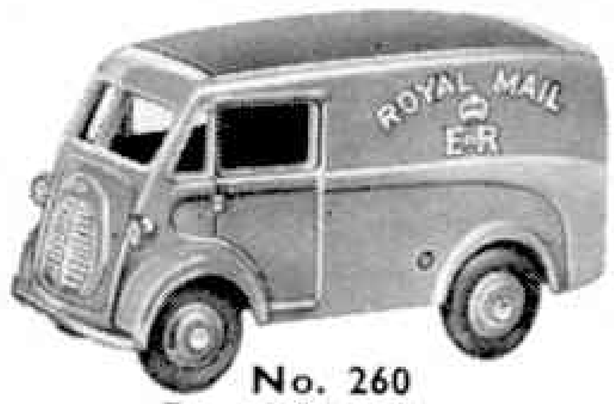
(See page 346)

1/-

DINKY TOYS

TRADE MARK REGD.

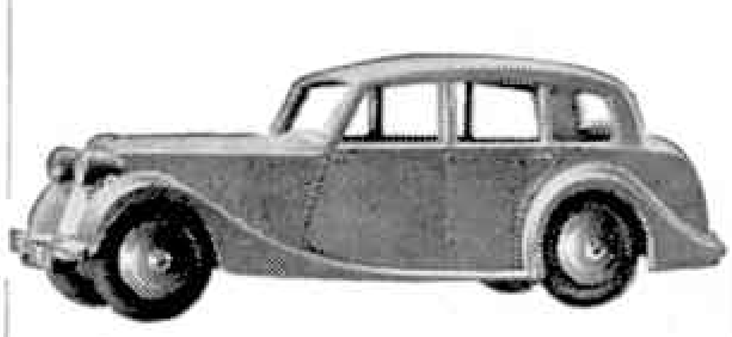
No. 109
Austin-Healey 100 Sports Car
Length 3⅜ in. **3/9**



No. 260
Royal Mail Van
Length 3⅛ in. **3/–**

No. 159
Morris Oxford Saloon
Length 3⅝ in. **2/6**

No. 452
Trojan Van, 15 cwt.
Length 3⅜ in. **2/6**

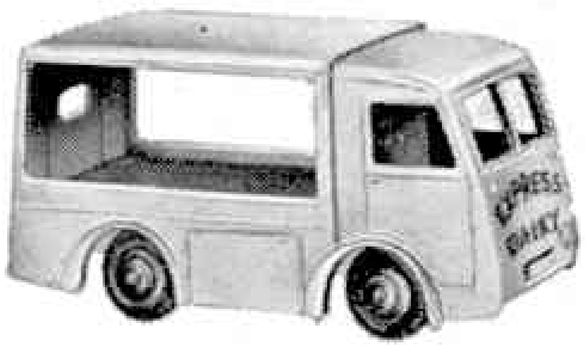


No. 151
Triumph '1800' Saloon
Length 3⅝ in. **2/4**

No. 623
Army Covered Wagon
Length 4⅛ in. **4/–**

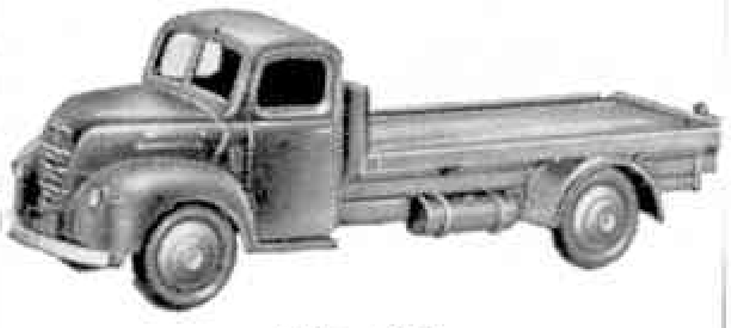
No. 133
Cunningham C-5R Road Racer
Length 4 in. **4/3**

No. 670
Armoured Car
Length 2⅞ in. **3/7**

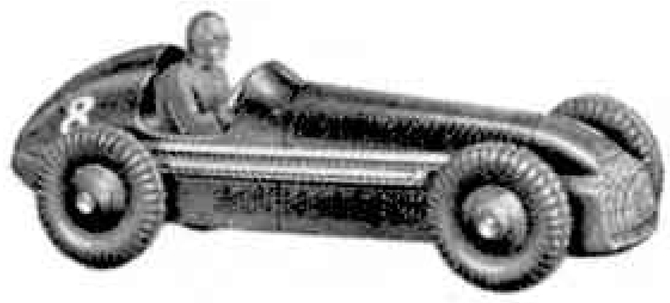


No. 490
Electric Dairy Van
Length 3⅜ in. **3/4**

No. 172
Studebaker Land Cruiser
Length 4¼ in. **2/9**



No. 422
Fordson "Thames" Flat Truck
Length 4⅜ in. **2/6**



No. 232
Alfa Romeo Racing Car
Length 4 in. **2/6**

No. 676
Armoured Personnel Carrier
Length 3¼ in. **4/6**

No. 108
M.G. Midget Sports
Length 3¼ in **3/9**

No. 301
Field Marshall Tractor
Length 3 in. **4/6**

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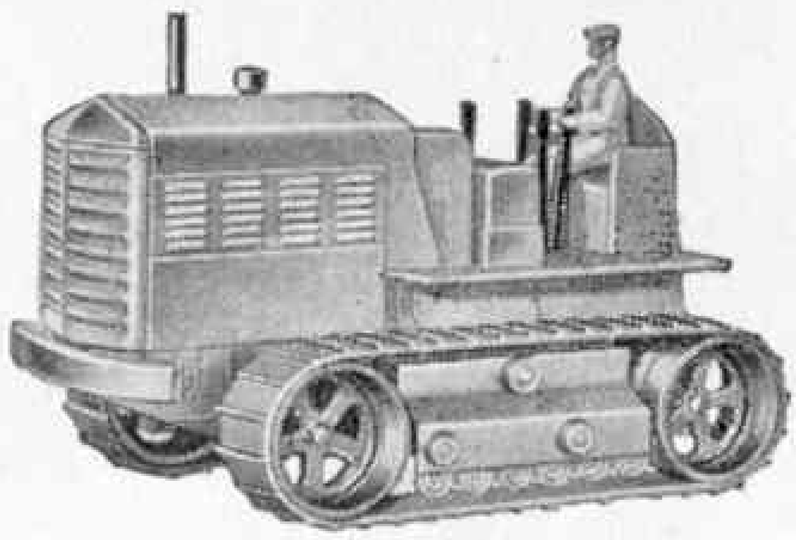
No. 942
Foden 14-Ton Tanker "Regent"
Length 7⅜ in. **9/6**



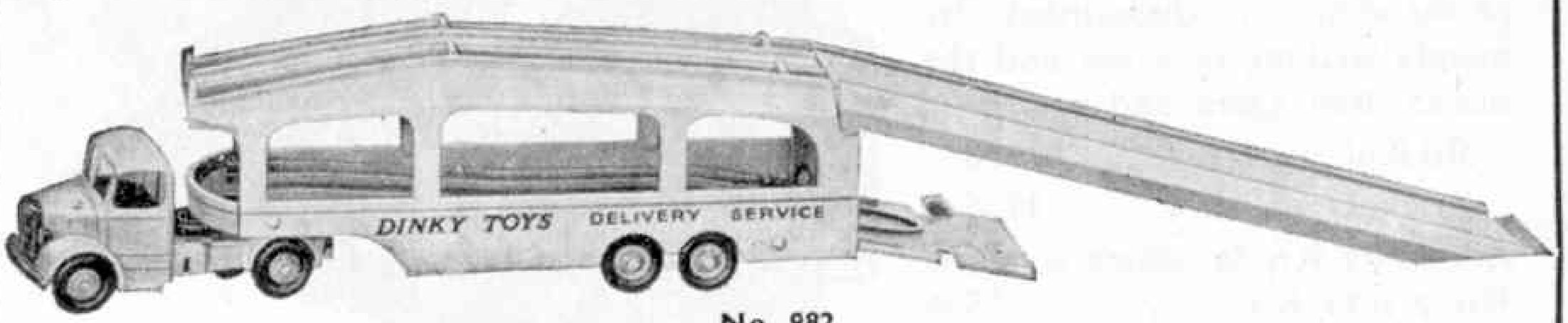
No. 963
Blaw Knox Heavy Tractor
Length 4⅝ in. **7/9**

No. 955
Fire Engine with Extending Ladder
Length 5½ in. **7/6**

No. 973
Goods Yard Crane
Base 4 in. square. Length of jib 7 in. **11/-**

No. 972
20-Ton Lorry Mounted Crane "Coles"
Length 9⅝ in. **17/6**

No. 962
Muir-Hill Dumper Truck
Length 4 3/16 in. **7/-**



No. 982
Pullmore Car Transporter with Loading Ramp
Length 9¾ in. **16/6**

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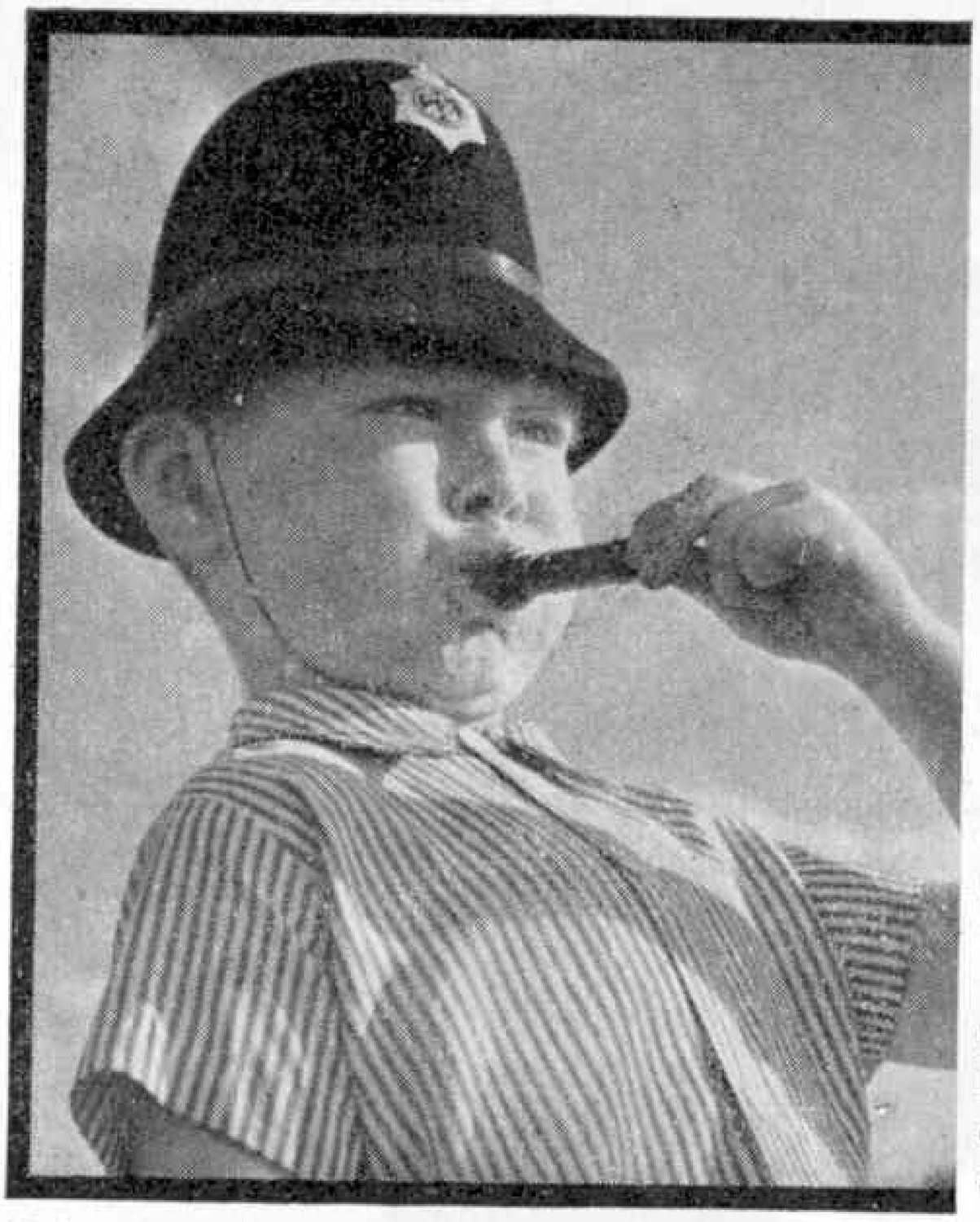

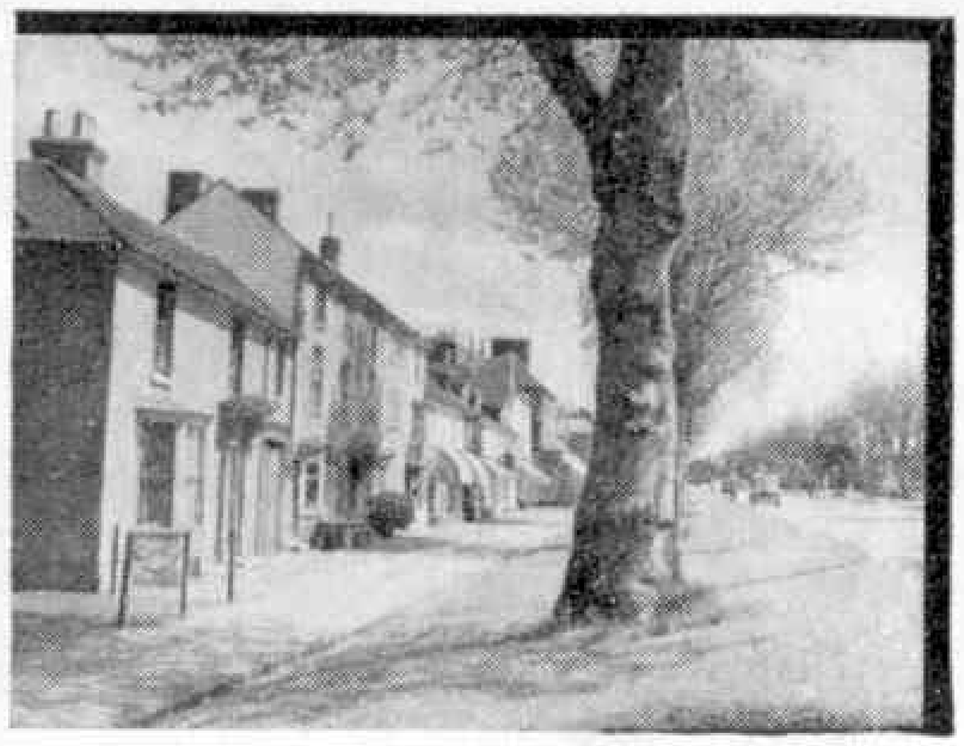

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Brickplayer Farm Kit.....56/6

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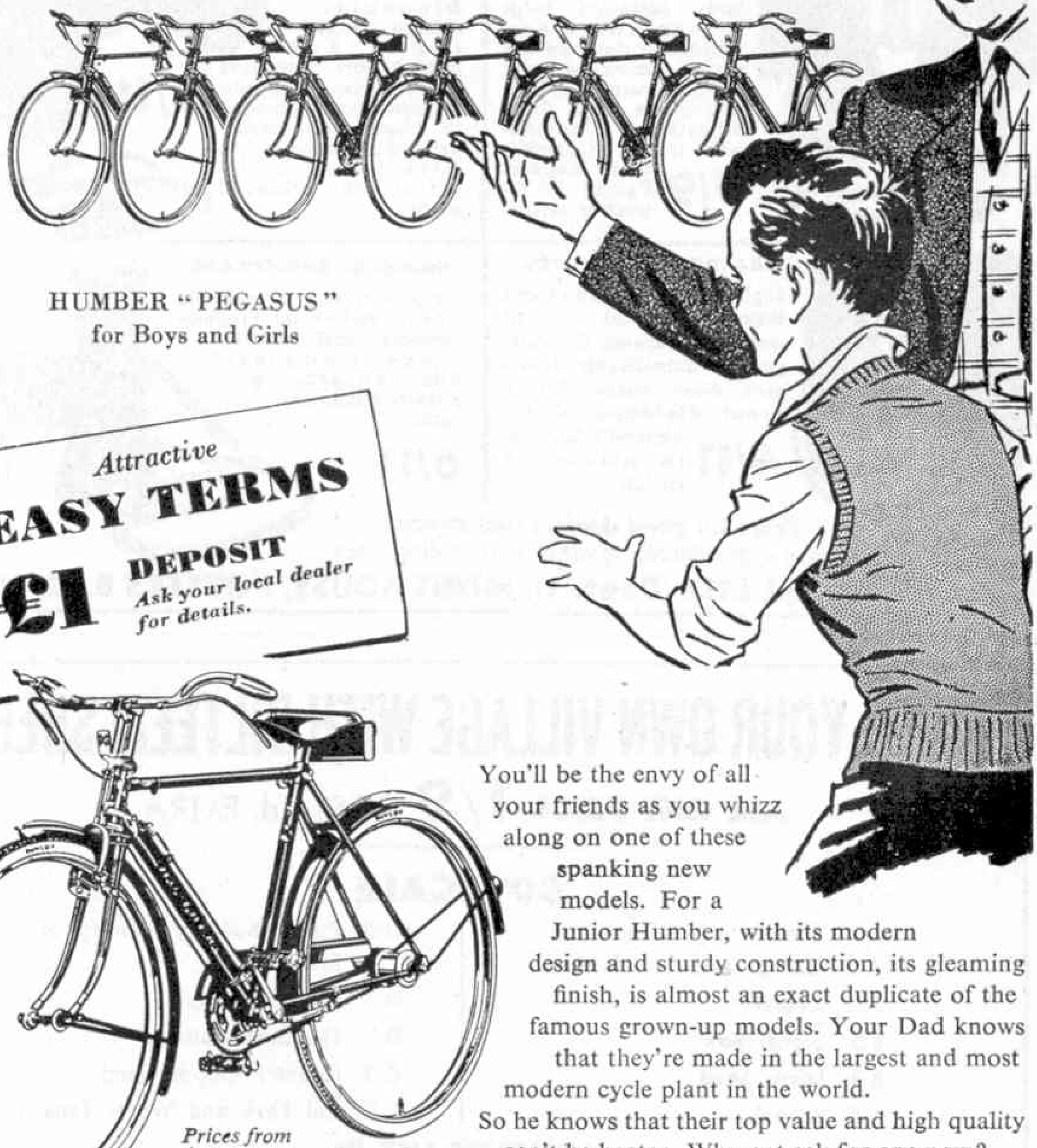

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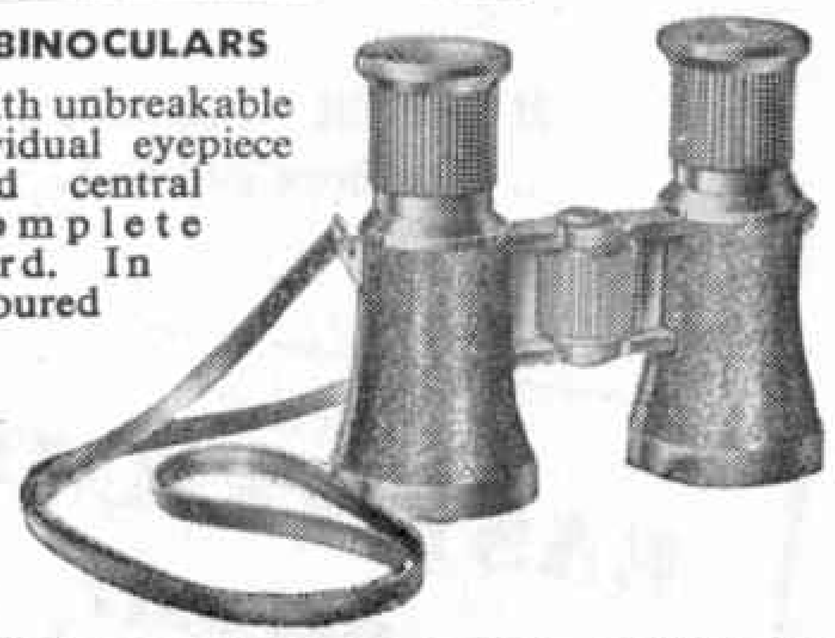

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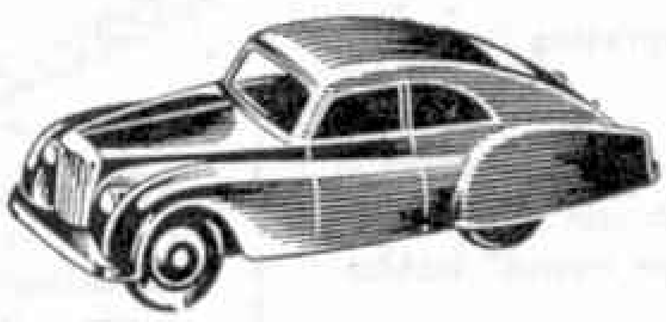

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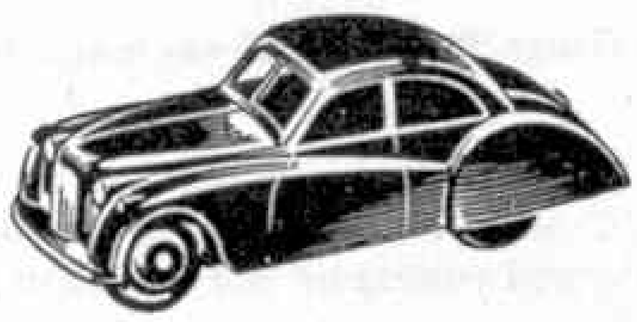

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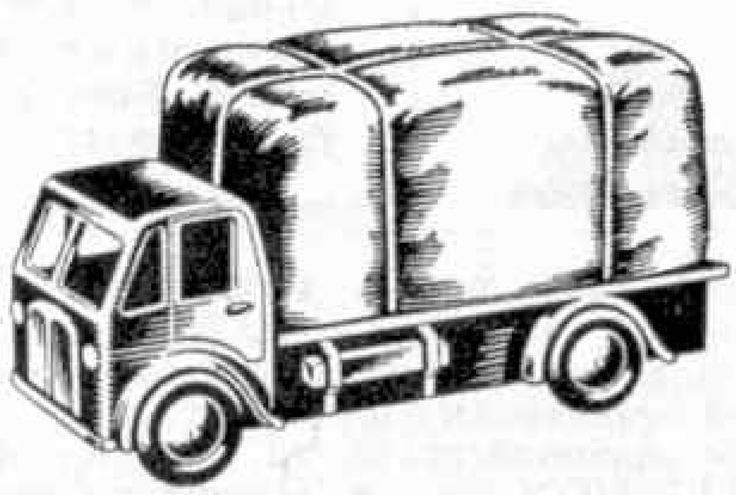

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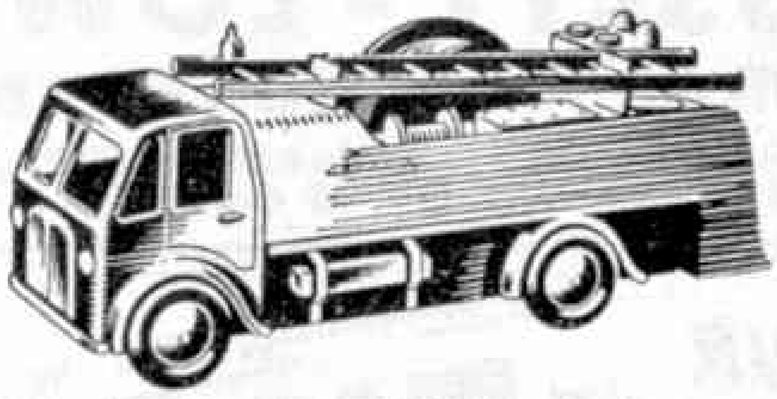

Minic "Push and Go" 000 Fire Engine. Length 3¾ in. Price **2/6**

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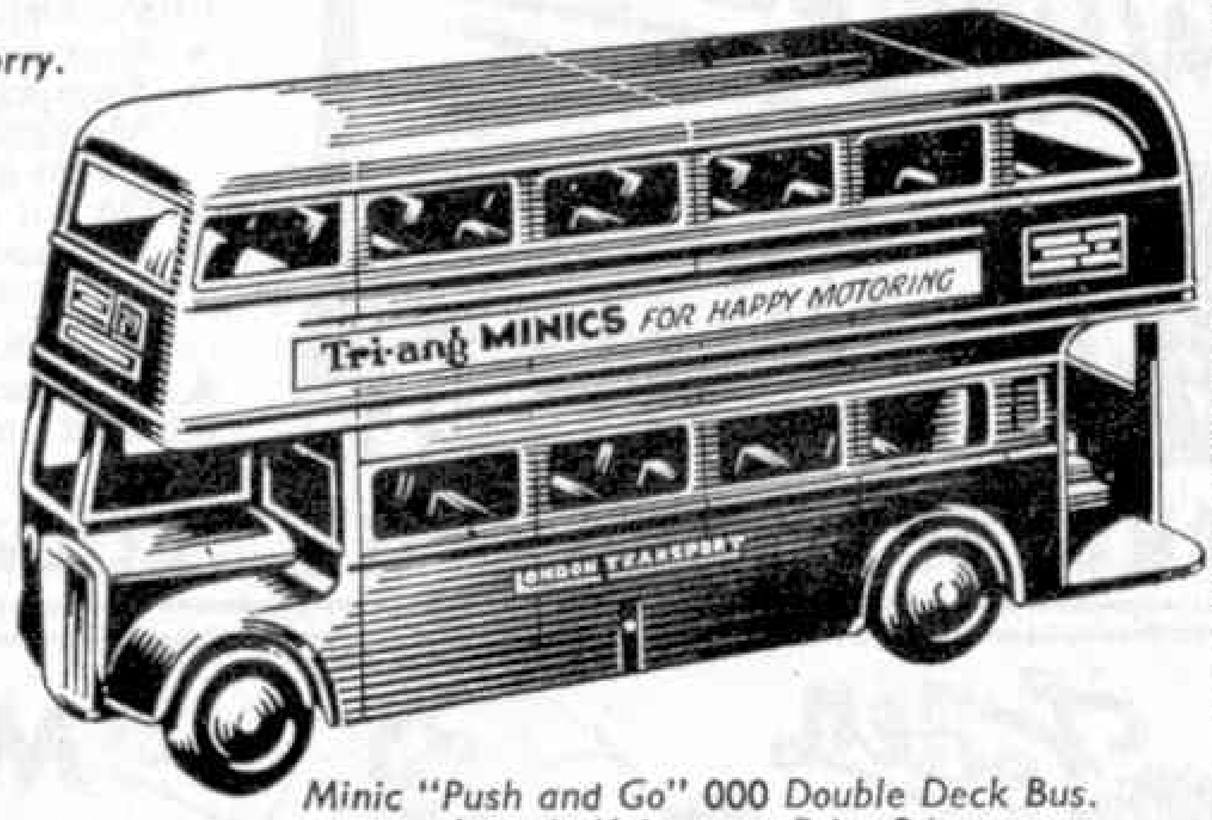

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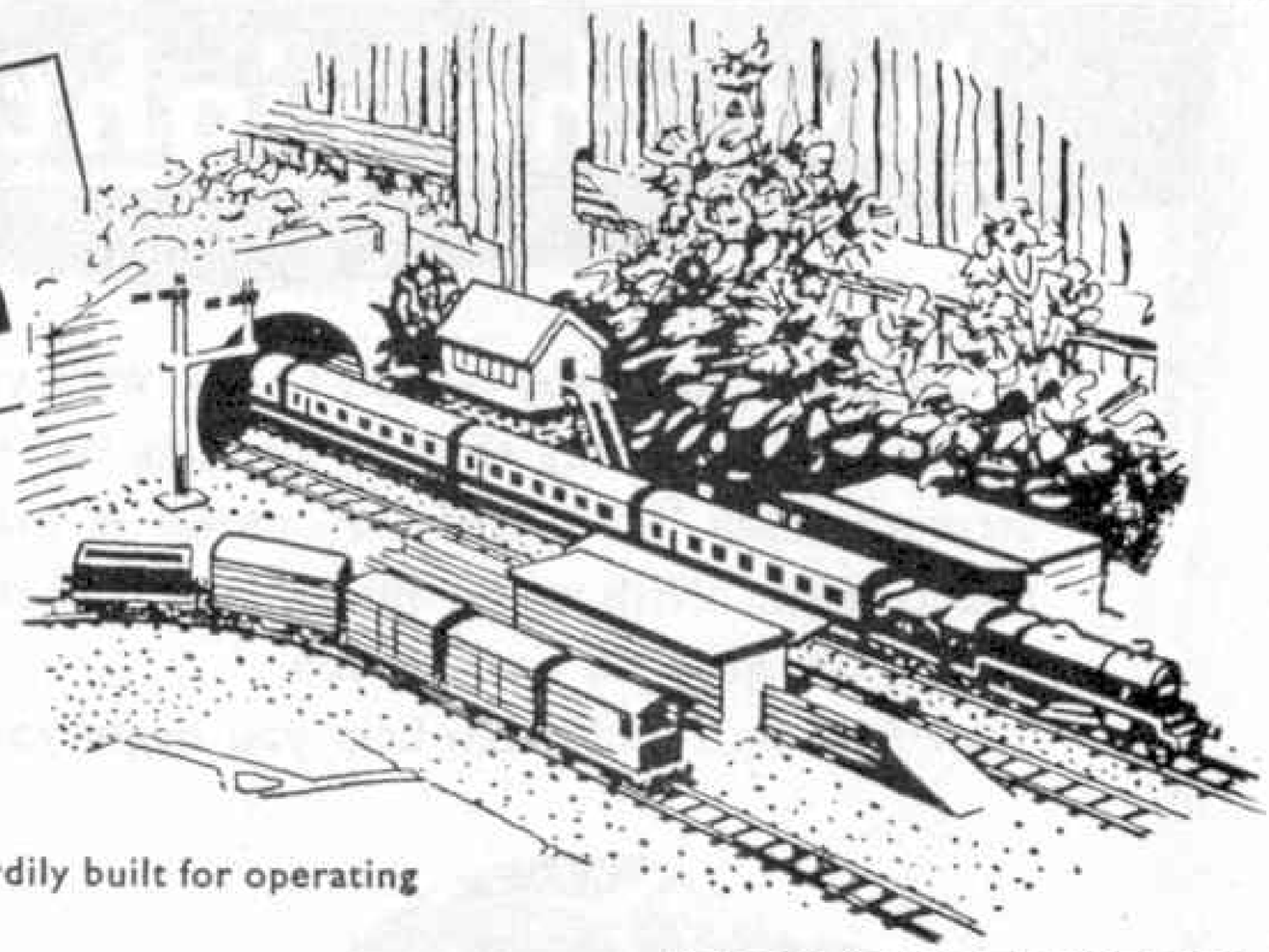

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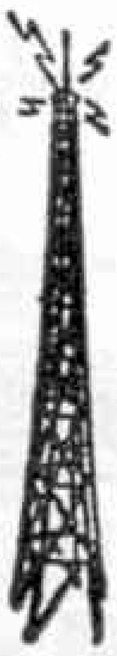

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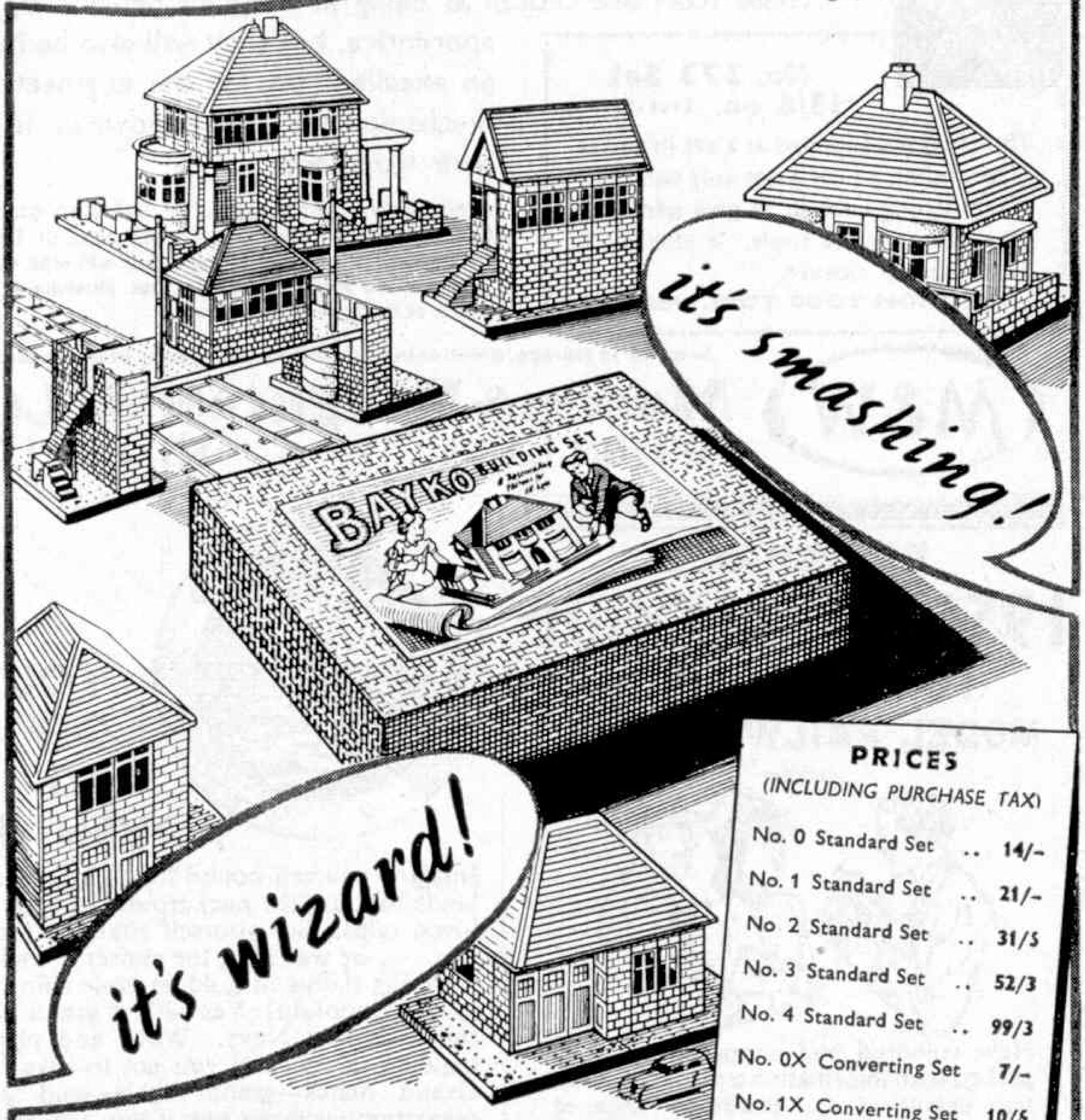

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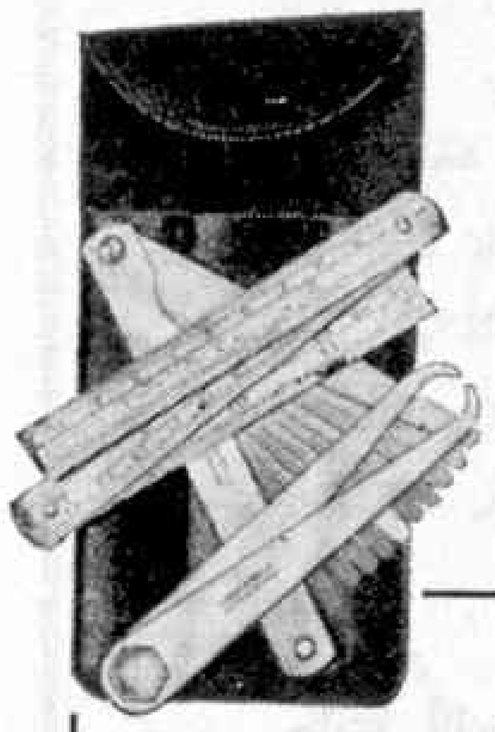

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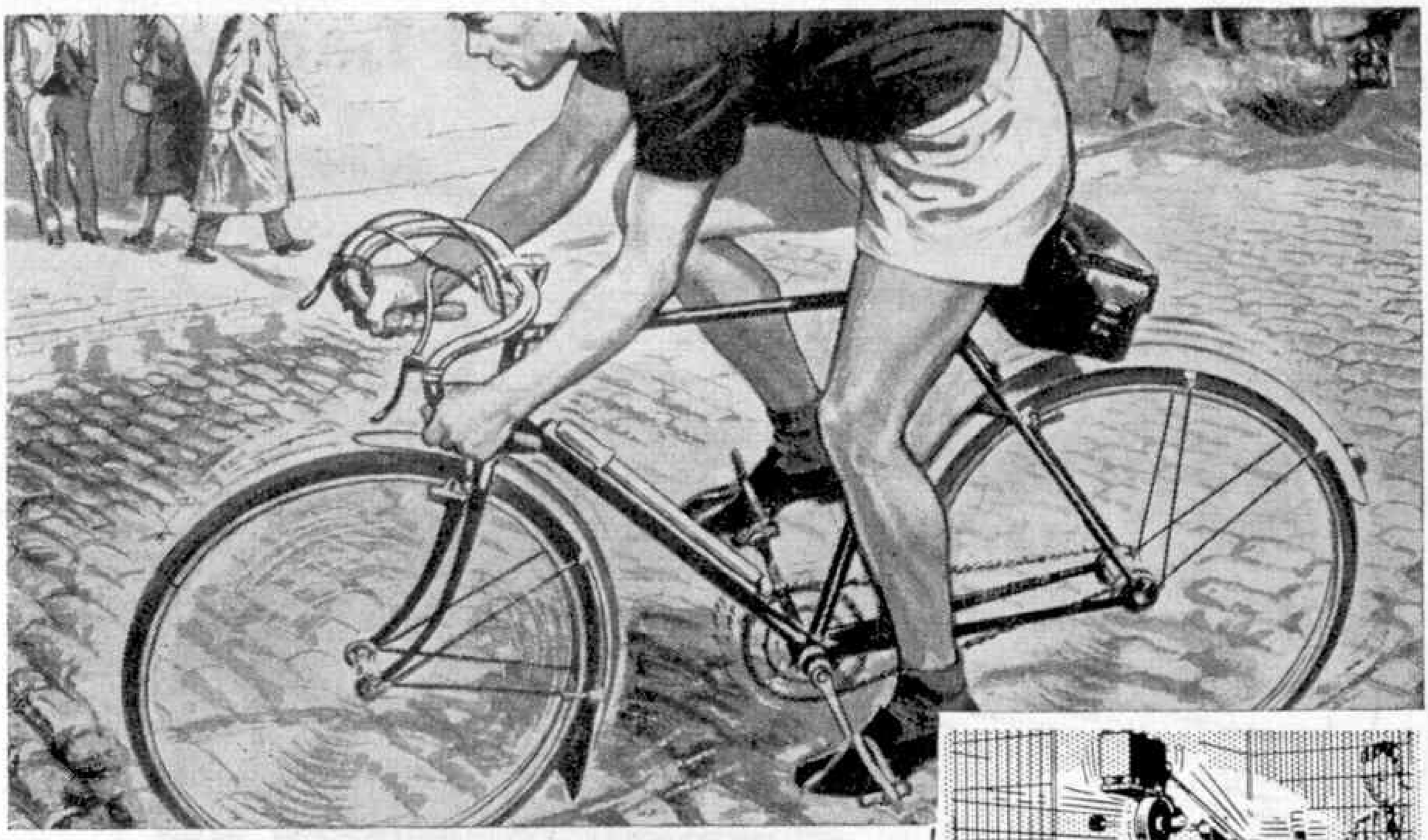
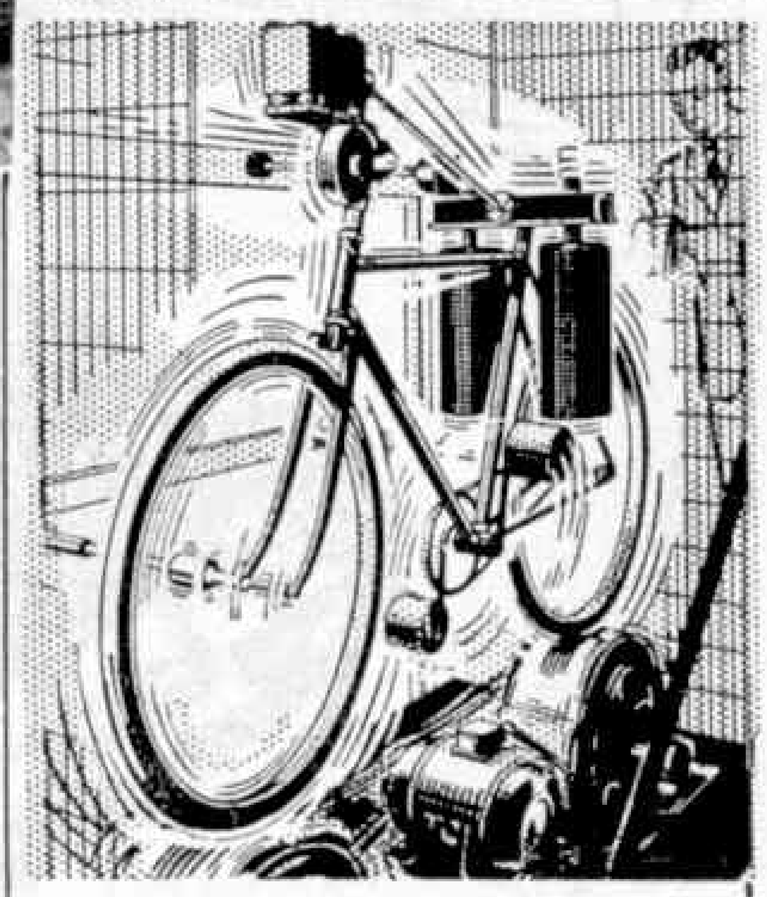


28 m.p.h. on a cobbled road —8 hours a day for 6 months!

Could a bicycle be ridden along a rocky road at 28 m.p.h.? Well if it's put to the test illustrated here it experiences the same sort of conditions. A new Triumph, with weights in place of a rider, was tested in this machine eight hours every day for six months. No serious damage occurred—although the bike had 'travelled' a hectic 30,000 miles! This was only one of the scientific tests carried out on the new Triumph before it was put into production. Laboratory researches into everything from enamel finish to metal fatigue were made by Triumph's back-room boys—they even invented special anti-vibration plates to make front braking safer. It is science that has made the new Triumph the most super bike you can get!



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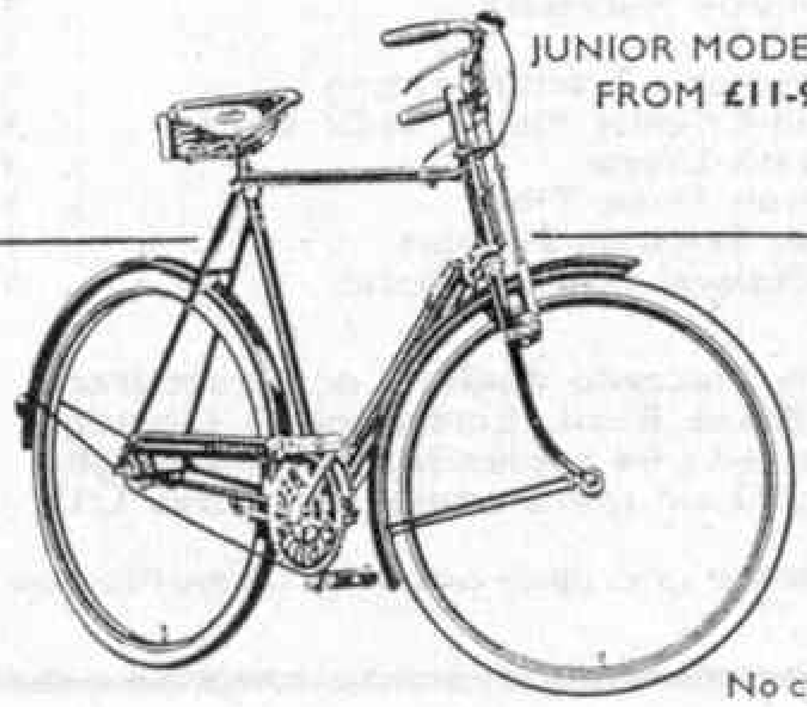

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Leaflet No. 13
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,,	2 (6-pages)	Sports Motor Car	,, 1/3
,,	3 (4-pages)	Coal Tippler	,, 1/–
,,	4 (6-pages)	Cargo Ship	,, 1/3
,,	5 (6-pages)	Double Deck Bus	,, 1/3
,,	6 (6-pages)	Lifting Shovel	,, 1/3
,,	7 (6-pages)	Block-setting Crane	,, 1/3
,,	8 (6-pages)	Beam Bridge	,, 1/3
,,	9 (4-pages)	Dumper Truck	,, 1/–
,,	10 (6-pages)	Automatic Gantry Crane	,, 1/3
,,	11 (8-pages)	Automatic Snow Loader	,, 1/6
,,	12 (8-pages)	4–4–0 Passenger Locomotive & Tender	,, 1/6
,,	13 (8-pages)	Combine Harvester	,, 1/6
,,	14 (4-pages)	Eiffel Tower	,, 1/–
,,	15 (6-pages)	Showman's Traction Engine ..	,, 1/3
,,	16 (6-pages)	Twin-Cylinder Motor Cycle Engine	,, 1/3
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MECCANO MAGAZINE

Editorial Office:
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EDITOR : FRANK RILEY, B.Sc.

Vol. XL
No. 7
July 1955

No Smoke on our Railways!

What next on our railways? Is it the disappearance of the rails and sleepers, and the conversion of the roadbeds into highways? This has been suggested, quite seriously. The scheme could certainly be made to give us a network of motor highways with practically no hills, on which high speeds could be maintained. But that is by no means enough, and it is difficult to imagine that we shall lose our railway tracks, which have given us such good service in the past and will do so for many years to come—but under a new deal.

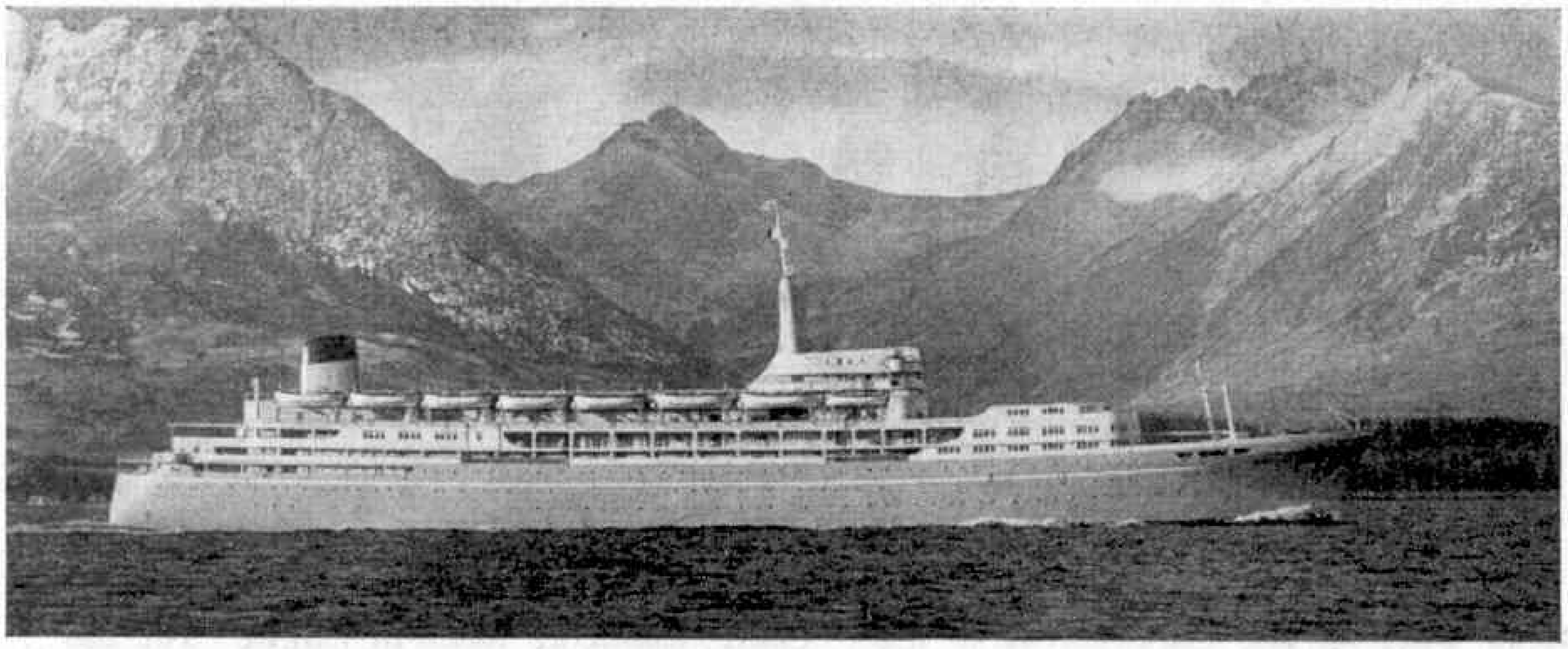
The steam locomotive has reached its final years, although it will probably be some time before the last of the tribe completes its final melancholy journey. I wonder if it is too soon to guess which steam engine will achieve this distinction. Will it be one of the 2–10–0 giants that began to emerge from Crewe only last year, or will it be some obscure tank or branch line engine?

The disappearance of the steam locomotive is not necessarily a disaster, as I realised a short time ago when I travelled from Manchester to Sheffield in the cab of one of the electric locomotives that now run on that very difficult line. On each side of Woodhead Tunnel there is a tremendous climb, about 20 miles in length. Yet the trains, both passenger and mineral, run briskly and easily, and timings for the latter have been reduced by nearly half. And this is done with no fuss, and without smoke and steam.

Her Majesty The Queen examining a display of Meccano Outfits and Parts on the stand of Meccano Ltd., at the British Industries Fair at Olympia, London, last May.

The electric locomotive may not carry the air of history and romance that distinguishes the steam locomotive, but until one has actually travelled over such a line as that between Manchester and Sheffield now is, it is difficult to realise what it means to be free from smuts and fumes—especially in the tunnels. I will tell you about the trip next month.

The Editor



The "Southern Cross"

A Passenger Liner of Revolutionary Design

THE handsome vessel seen in the illustration at the head of this page is a modern liner, built by Harland and Wolff Ltd., Belfast, for the Shaw Savill and Albion Co. Ltd. She has a curved rounded stem and a cruiser stern, and is finely modelled throughout. A mere glance at the picture, or at the vessel herself, reveals one very unusual feature that marks her out at once as differing considerably from other liners. This is the position of the funnel, which is streamlined and has a well rounded top, and is placed aft instead of in the traditional position more or less amidship. A vessel with a funnel so far aft usually is a tanker, but the *Southern Cross* could never be mistaken for such a ship, and indeed she is unique in being a liner that carries no cargo, the available space within her being devoted entirely to passenger accommodation.

The fine vessel seen in the picture at the head of the page is the new 20,000 ton Shaw Savill Liner "Southern Cross." She has been built to carry passengers only, and is the first British liner to have her propelling machinery and funnel aft. The illustrations on these pages are reproduced by courtesy of the Shaw Savill and Albion Co. Ltd.

The decision to make the *Southern Cross* a purely passenger liner has had some very interesting consequences. When a vessel carries cargo it is sometimes difficult to make sure that this is brought to the ship's side, and is stowed in the holds, in time to allow for departure from a port at the scheduled date. The absence of cargo space in the *Southern Cross* ensures that passenger schedules will be maintained, and one result has been that the vessel is able to make four round voyages a year to New Zealand, Australia and South Africa instead of the three possible in the same time for a vessel carrying both passengers and cargo.

Another gain is that there are no engine room casings, cargo hatches and funnel uptakes in the space amidship, the best part of the ship. The whole of this is taken up with passenger accommodation, and the layout of the public rooms and of the passenger cabins has been made easier as a result.

One interesting point about the *Southern Cross* is that problems of trim are simplified. When cargo is taken out of a hold, or stowed in it, the trim of the vessel naturally is affected, and this follows also as the oil fuel now almost universally used is consumed. In vessels of conventional design the practice is often followed of filling with salt water the tanks from which the oil has been used. In the *Southern Cross* there is a triple-effect distilling plant that gives plenty of fresh water for all passenger requirements, with a sufficient reserve to allow the oil fuel tanks to be filled with water as required. This use of fresh water avoids the corrosion and other effects that follow when salt water is employed.

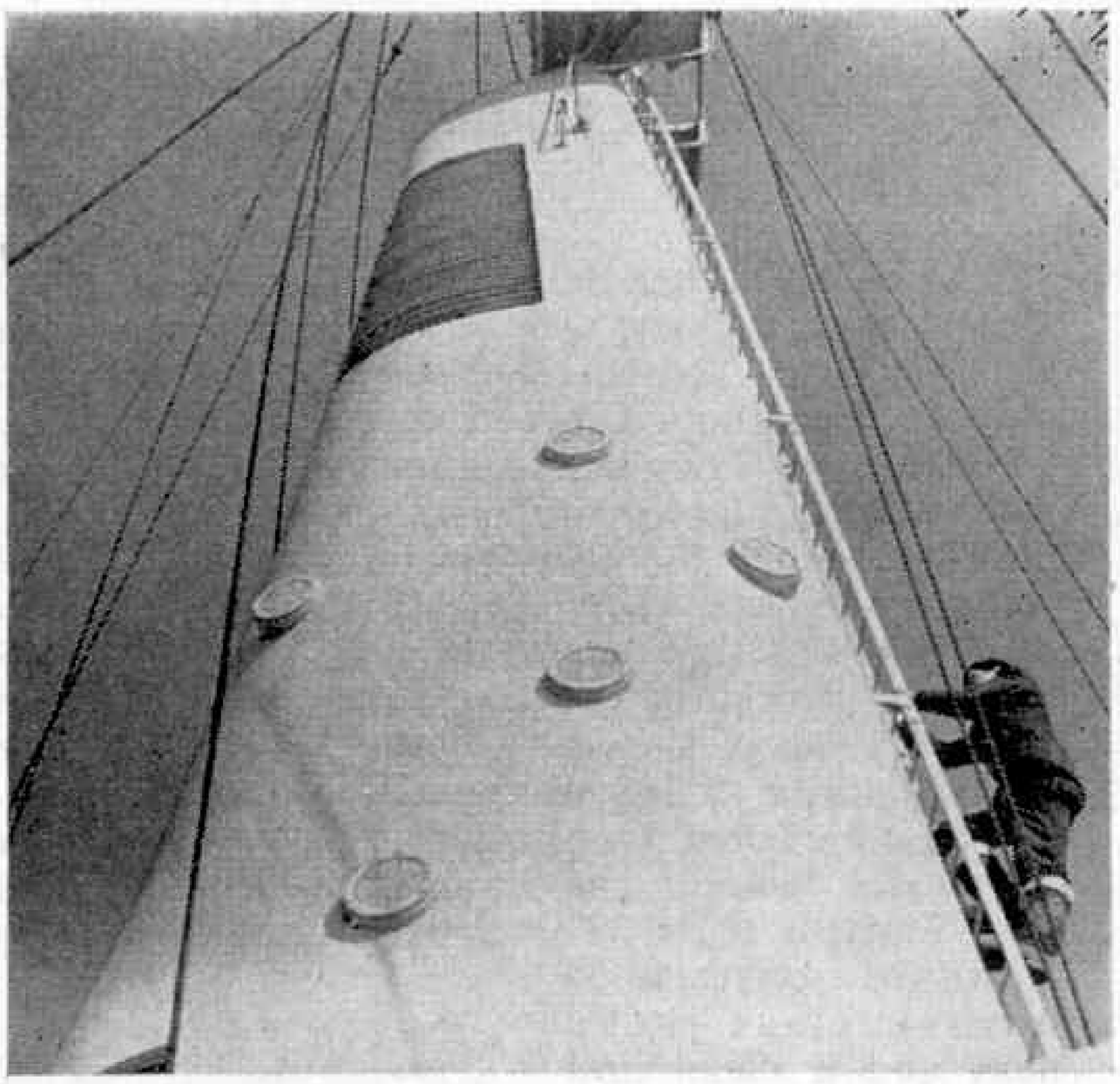
While the absence of hatches and other obstructions has eased the planning of public rooms and other accommodation, it has involved the introduction of a large proportion of centre-line cabins. This

indeed was necessary in order to make full use of the space available. These cabins are made comfortable by the provision of air conditioning, and indeed the plant installed in the *Southern Cross* provides fresh air at a standard temperature for every part of the passenger accommodation, and ensures everywhere the same comfort in all weathers.

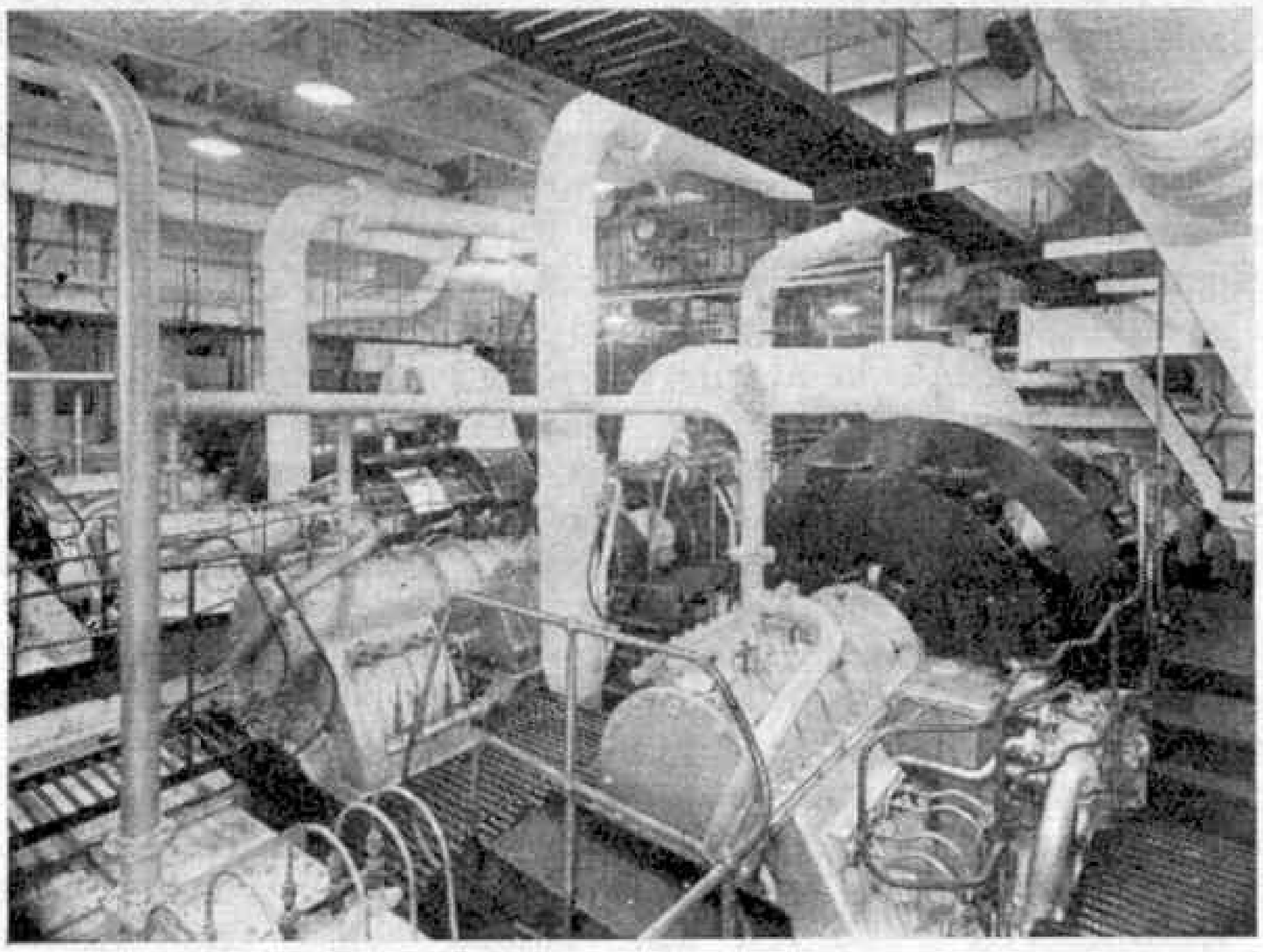
Another interesting and novel feature of the *Southern Cross* is the mast. This is built up of steel and is striking and distinguished in appearance, as the upper illustration on this page shows. Actually the galley exhaust is incorporated in it.

At night, lights in the sides of the mast form the outline of that well-known feature of southern skies, the constellation known as the Southern Cross, after which of course the vessel herself is named. These four bright stars are as characteristic of the skies of the southern hemisphere, through which the *Southern Cross* voyages, as are those of the Great Bear in the northern hemisphere. As the *Southern Cross* makes her way southward, this brilliant constellation can been seen low in the heavens when the latitudes twenties are reached, and it rises gradually higher as the southern voyage progresses.

The round-the-world voyages of the *Southern Cross* are a romance in themselves. She travels from Southampton either westbound or eastbound, as required. When westbound she crosses the Atlantic to the Panama Canal, calling at Trinidad and Curacao. After passing through the Canal she crosses the Pacific, to Tahiti, the Fiji Islands and Wellington in New Zealand. Then across the Tasman Sea to Sydney, and on to Melbourne and Fremantle before crossing the Indian Ocean to Durban and Cape Town on her way back to London. The eastbound voyage follows the same course in the reverse direction.



The striking built-up steel mast of the "Southern Cross."



Looking forward in the engine room, showing the turbine cases.

Here are a few details of the vessel herself. Her overall length is 604 ft. and her geatest breadth 78 ft. 3 in. She has a moulded depth of 45 ft. 3 in. and a load draught of 25 ft. 1 in. Her gross tonnage is about 20,000 and her 20,000 shaft horse power engines give her a service speed of 20 knots. She was launched at Queens Island, Belfast, on 17th August of last year by Her Majesty Queen Elizabeth.

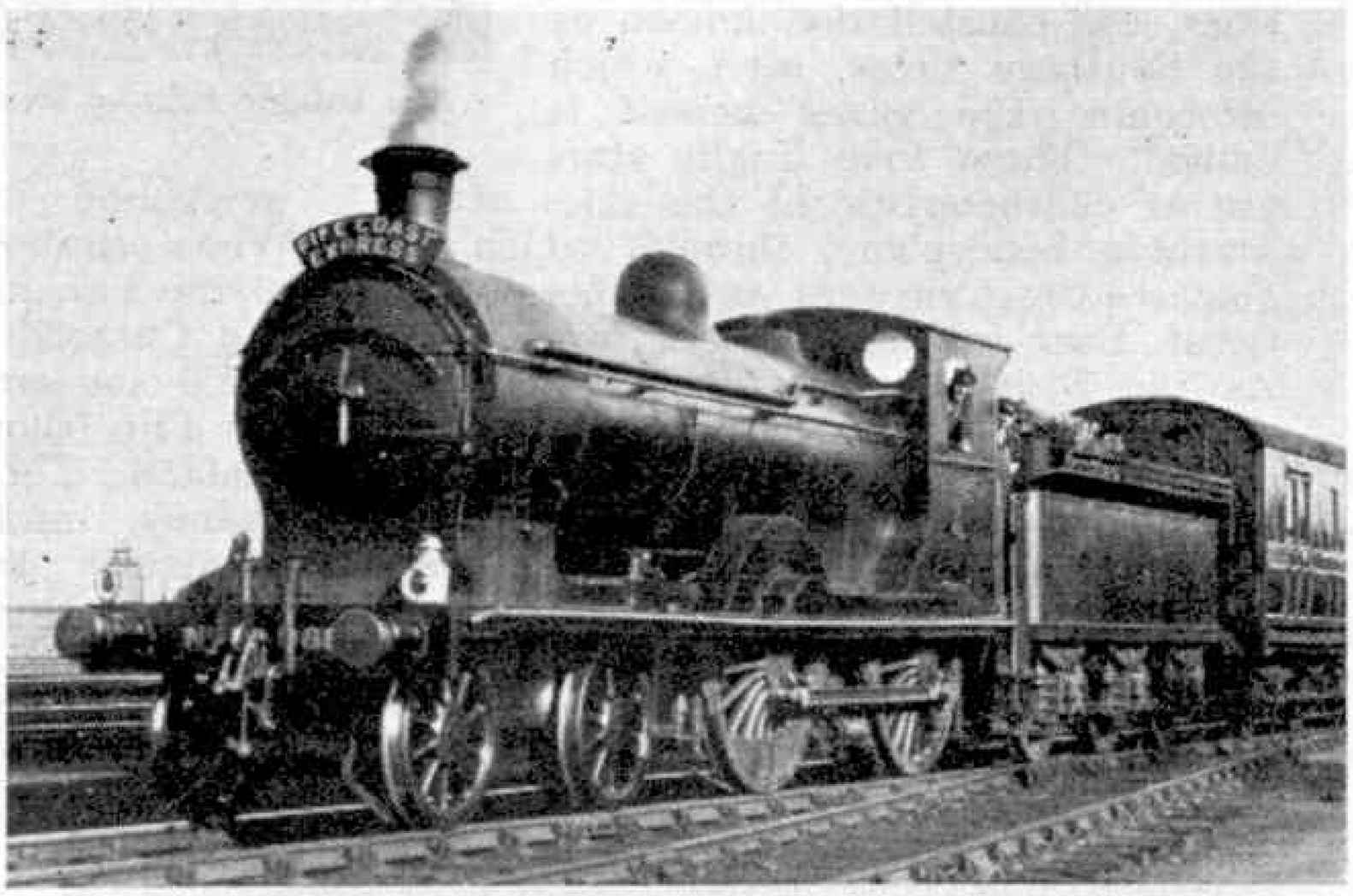
The machinery installation consists of a twin screw arrangement of geared turbines with high pressure boilers. The main boilers are three in number, of the

(*Continued on page 400*)

Train Name Headboards

By R. D. Stephen

TRAIN name headboards on locomotive smoke-box doors are now familiar in all Regions of British Railways, so much so that some may think they are a little monotonous. They would have been more appealing if slightly different designs had been adopted by each Region. It is pleasing to see that the Southern has produced a design which differs from the standard, no doubt to blend suitably with the front end of the air-smoothed Pacifics. Special praise is due to the originators of the board carried by the *Royal Scot* with the shield bearing the Lion Rampant in true Scottish style. The British Railways standard pattern is nevertheless very neat and a clean and pleasing appearance can be maintained with little trouble.



The engine of the Fife Coast Express, carrying a headboard of N.B.R. style, photographed in 1925. The engine is a Reid mixed traffic 4-4-0, by then L.N.E.R. No. 9886.

Not so many years ago, with the exception of the Great Western Railway and its *Cheltenham Flyer*, the only line to adopt this style of advertisement was the late L.N.E.R. Even then, it was only some of the ultra-distinguished expresses that carried headboards. The effect was the more striking because the trains were made up of the latest stock in the best of condition. In other words, you felt you really were looking at a crack train. This is not to say that the *Royal Scot* or *Cornish Riviera Express* were not very fine looking; they were.

Notable L.N.E.R. trains without headboards were the *Coronation* and *Silver Jubilee*, but they were sufficiently striking in themselves, and headboards would have detracted somewhat from the perfect streamlining effect of the wedge-shaped front ends of their locomotives.

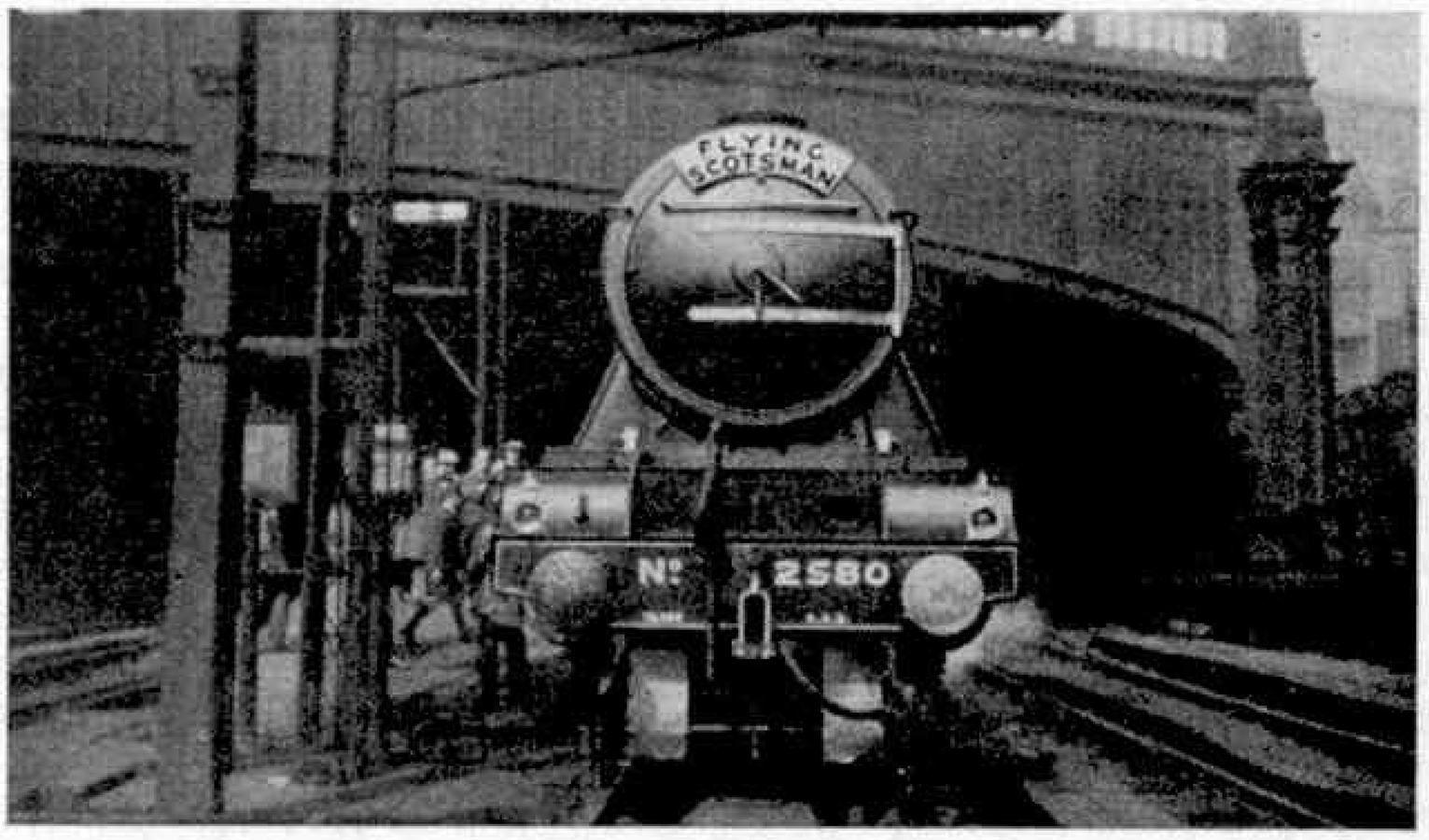
I have often wondered if the present standard headboard can owe its origin to the old North British Railway. For this view there appears to be some justification, if we can assume that the present board is simply a neater and more practical form of the painted black and white L.N.E.R. version made of steel plate.

It was in 1928 that a headboard first appeared on the L.N.E.R. at King's Cross. This was on the first arrival at that terminus of the non-stop *Flying Scotsman* from Waverley. The engine was Gresley Pacific No. 2580 *Shotover* which, incidentally, was one of the first of the North Eastern Area A1s to receive the higher-pressure boiler, to become class A3. It was not until some time later that the King's Cross Pacifics came along with a similar headboard.

Undoubtedly *Shotover's* adornment could be attributed to Haymarket shed, or to the Operating Department of the Southern Scottish Area in Edinburgh. Onlookers waiting for the arrival of the inaugural up non-stop at King's Cross must have been puzzled when they saw the white patch on the smoke-box approaching from the end of the platform and, we hope, they were delighted when they were able to make out what it was.

Now it had long been the custom of the N.B.R. to have destination boards, neatly curved and placed below the chimney, and one of their trains bore an official title

even before the first World War. This was the *Lothian Coast Express*, which provided a fast service in the late afternoon from Glasgow to the East Lothian resorts of North Berwick and Gullane, and also to Dunbar. The return was made the next morning in time for a late office start in Glasgow. The two first named places were on branch lines, while Dunbar is farther away on the main East Coast line, so the train consisted of three portions. It may well have been that the headboard was regarded not only as an advertisement, but as a simple and practical manner of indicating the general destination.



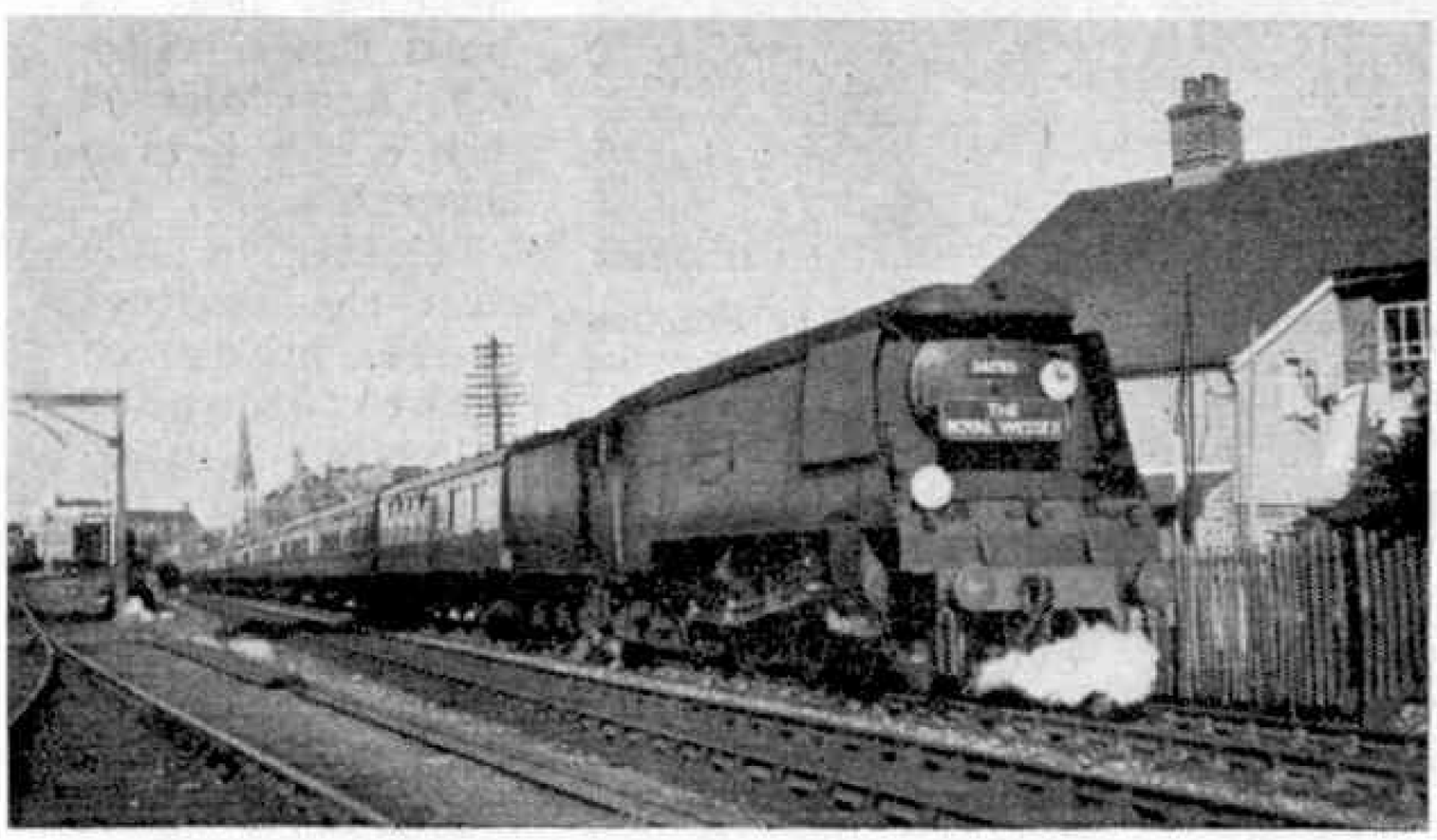
Gresley Pacific No. 2580 "Shotover" with the characteristic curved name-board that seems to have been developed from earlier N.B.R. practice.

The full name *Lothian Coast Express* was painted in white letters edged in black on a red board, while the carriages had a beautifully curved pattern with gilt letters. Similarly shaped boards were used on the through carriages to Inverness via the Highland, as well as on the through service to Elgin on the old Great North of Scotland Railway, and many older readers may remember these, as they continued for some years after the grouping of 1923.

The original N.B. headboard had two small legs that fitted into slotted lugs on the smoke-box front. So there was no possibility of its finding its way to the centre lamp bracket on the buffer beam and being obscured by the vacuum pipe, which so often happens to headboards nowadays. Admittedly, the British Railways design is a very heavy casting and it must be difficult at times on the front of an A.4 to achieve the correct position for it below the chimney.

The *Lothian Coast Express* fell by the wayside during the 1914–18 war. It returned after the end of hostilities, but not for very long, as times had changed and the Glasgow business man no longer spent the summer travelling to the East of Scotland from Glasgow every day.

Other named trains on the North British were the *Fife Coast Expresses*, which ran from Edinburgh and Glasgow respectively to the East of Fife and St. Andrews, again at times suitable to the business man. The Edinburgh train had a headboard at least until 1925, and it is possible that the Glasgow train still has, as there are photographs showing that the title was revived after the Hitler War. In 1925 the board heading the train from the Scottish Capital had the word *Edinburgh* on the reverse side, which may mean that the inward morning train was not named. This again suggests that the name boards were to indicate destinations, not for show.



Bulleid Pacific No. 34093 "Saunton" carries the modern style of headboard when hauling the up Royal Wessex. The train is leaving Bournemouth Central.

Secrets of Rocket Power

Climbing 242 Miles Above the Earth

By Eric Burgess, F.R.A.S.

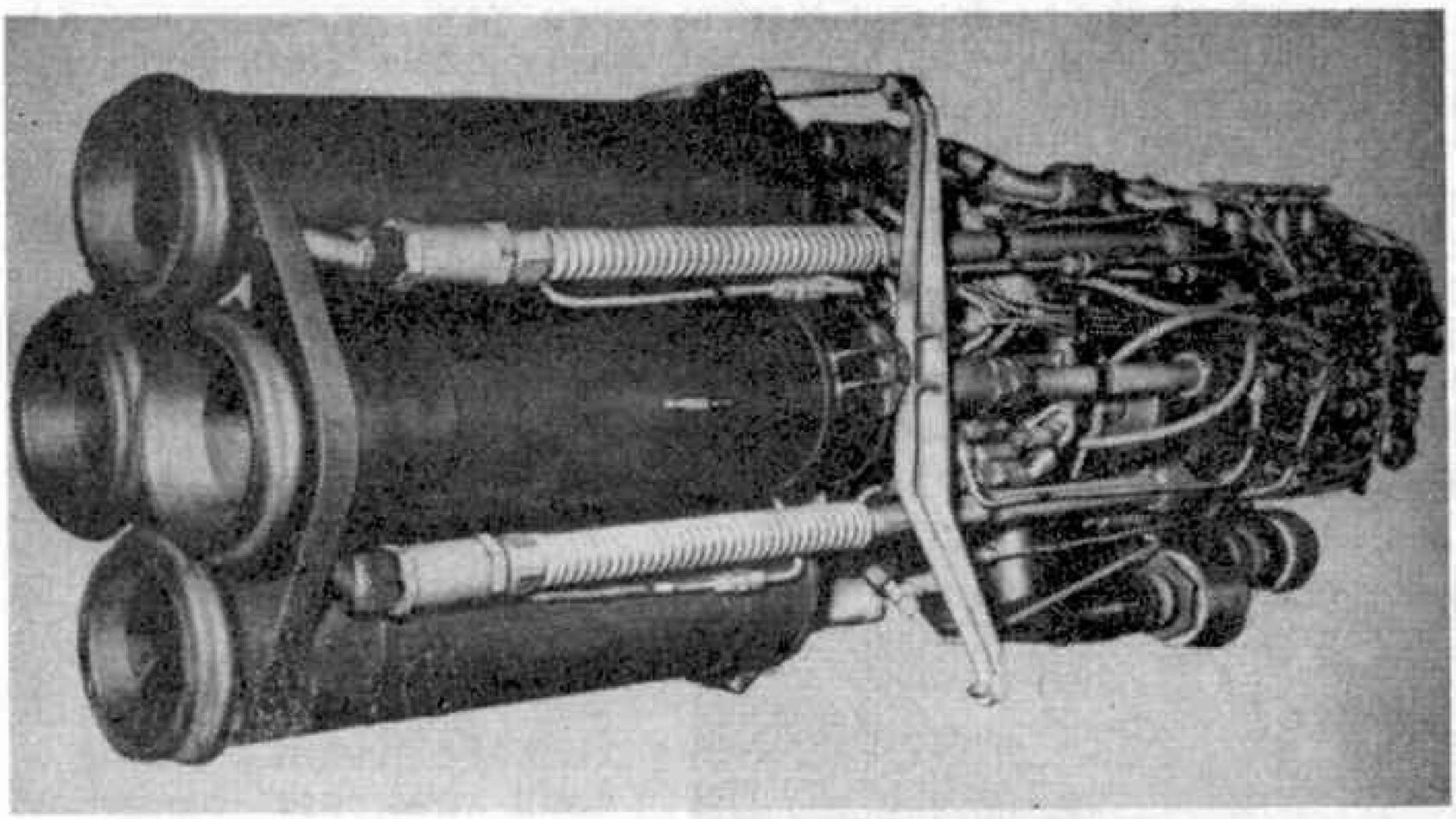
TODAY we are in the age of rocket power, and high-altitude research rockets have now carried instruments to a height of 242 miles above the Earth's surface. Many new technicians will have to be found in the coming years from the youth of today in order to supply the growing need for scientists and engineers in the guided missile and rocket industries.

Although the rocket motor contains no moving parts, its apparent simplicity is deceptive and its development a difficult engineering project. Basically a rocket motor, such as one used for the assisted take-off of an aircraft, employs compressed air to force propellants—a fuel like petrol and an oxidiser such as liquid oxygen—from storage tanks into a combustion chamber. There the fuel burns and a large quantity of heat is released.

Now when a gas is heated the effect is to cause the molecules of that gas to move about more quickly. In the rocket combustion chamber the changes that occur produce gases, the molecules of which do move about *very* quickly. A specially designed exit to the chamber, known as an expansion nozzle, guides them so that they rush away from the rocket and produce the recoil that is its driving force.

In large rockets, similar to the German V-2, and in many rocket-propelled aircraft, the propellants are forced into the combustion chamber by high-speed pumps, which are driven by a turbine. Rockets consume vast quantities of propellants in a remarkably short time. The V-2, for example, burned eight tons of alcohol and liquid oxygen in less than a minute. But what a return for this gigantic appetite! The V-2 motor gives more power than the engines of a large trans-Atlantic liner. No wonder the rocket speeds up to 3,500 miles an hour in those sixty seconds of motor operation!

The pumps are difficult parts of the rocket motor to perfect. This is especially so when they have to feed liquids such as concentrated hydrogen peroxide, fuming nitric acid or liquid oxygen. During the development of the Armstrong-Siddeley Snarler, much trouble was encountered with the design of the pump for the liquid oxygen. One serious explosion was caused by the failure of a bearing which allowed the aluminium casing to be powdered by the impellor. A mixture of aluminium powder and liquid oxygen is a powerful explosive, and friction produced sufficient heat to start this mixture off and disrupt the pump assembly.



This four-cylinder liquid oxygen and alcohol rocket engine, developed by Reaction Motors Inc., has already sent the Bell X-1a travelling at two and a half times the speed of sound and up to an altitude of over 16 miles.

Again, in one test the bearings were made of asbestos and a plastic. Liquid oxygen leaked to them, ignited the plastic and destroyed the pump. Nitric acid likewise corrodes pump parts, and hydrogen peroxide and liquid oxygen can combine with lubricants to produce fire or explosion. Ingenious designs of seals, bearings and escape vents to

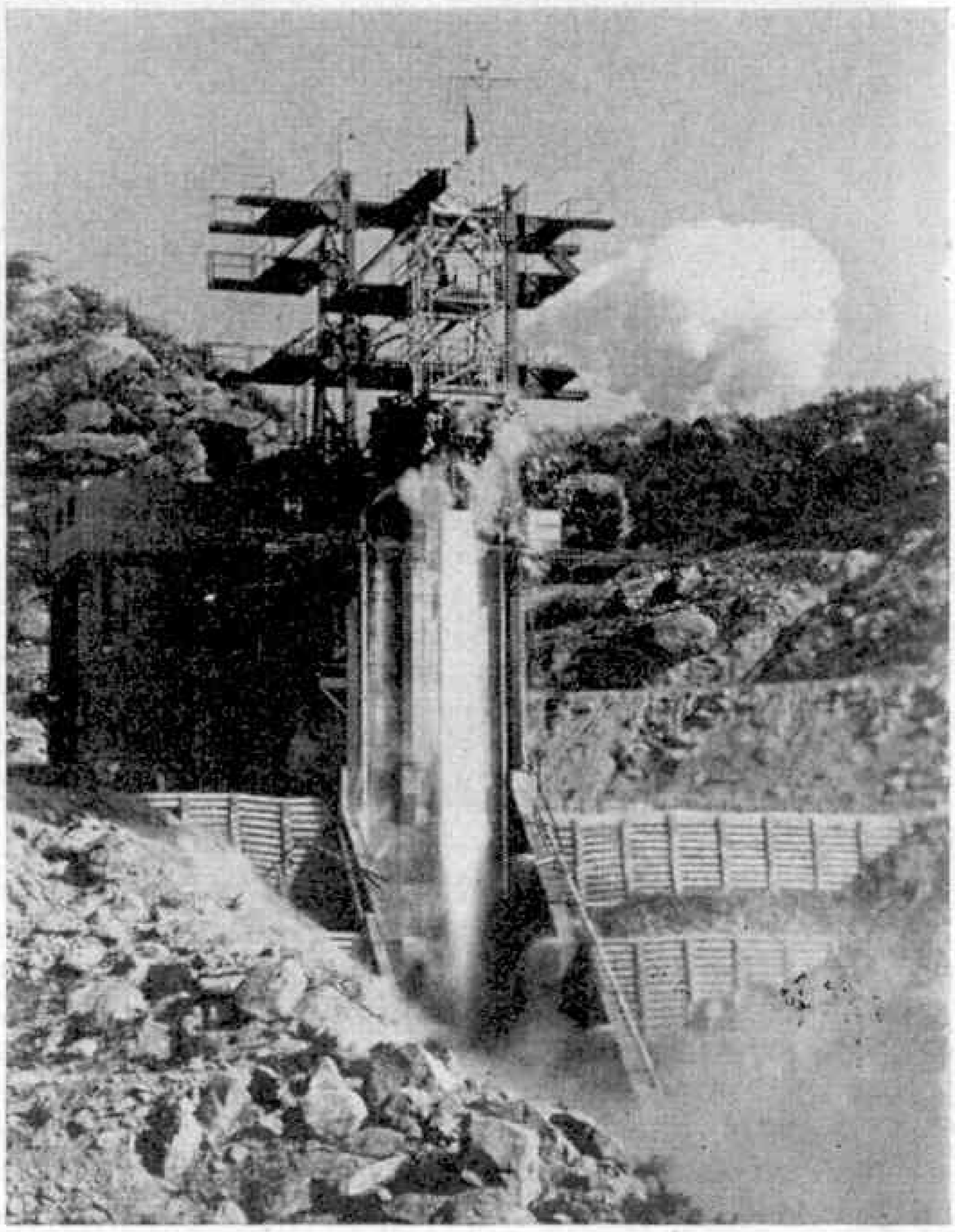
prevent vapour locks have now obviated these difficulties.

In the combustion chamber, the temperature of the hot gases that result from the burning of the propellants reaches between twenty and thirty times that of boiling water. The inside of the chamber becomes hotter than a furnace, so rocket motors need efficient cooling in order to prevent the metal walls from melting away. This is done nowadays by having double walls to the combustion chamber and expansion nozzle, a system known as regenerative cooling, in which the space between the walls is swirled with fuel to keep the metal cool.

The difficulty in design is to have the correct proportions at all parts of the coolant passage, so that a steady flow of liquid passes continually over all parts of the combustion chamber. Helical guide vanes in the coolant passage are used to ensure this. Sometimes it is also necessary to spray fuel into the combustion chamber through a series of tiny holes, so that a thin layer of unburnt fuel builds up inside the wall and protects it from the intensely hot gases at the centre of the chamber. This is known as film cooling. A more advanced system, which engineers are developing to attain greater efficiency, is to have a porous wall to the combustion chamber through which cooling fuel can continually seep. This is known as transpiration or sweat cooling.

The injection of the propellants into the combustion chamber must take place smoothly. The two liquids must be intimately mixed as fine droplets, and be ready for vapourising and burning as quickly as possible after injection. Many different types of injectors are in use. Some use impinging conical sprays of liquids; others consist of many tiny holes like the rose on a watering can. Instability in the injection process can make the motor start to chug and develop a varying thrust. It has been found by experiments that different propellant combinations need different types of injectors. In practice the injector flow pattern is tested outside the combustion chamber with honeycombs of sampling cans arranged to collect the spray, so that the mixing over the area of the combustion chamber can be analysed.

The types of propellants used in rockets are many and varied. Basically we need an oxygen carrier and a substance which will yield a large amount of heat when it is burnt in the oxygen. So far we have employed liquid oxygen, nitric acid, and high-strength hydrogen peroxide as the main oxidisers.



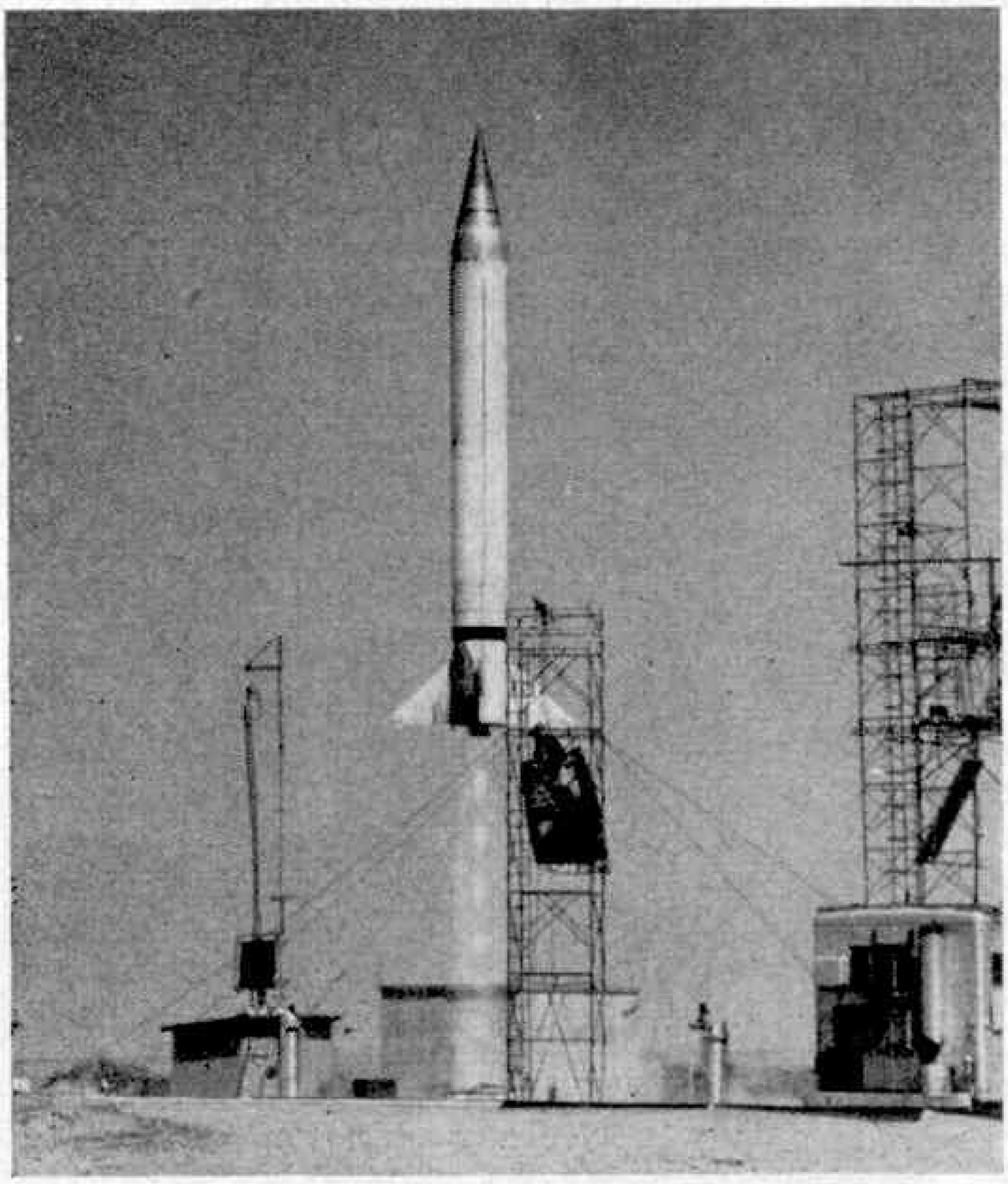
North American Aviation Co. are developing rocket engines for missiles and aircraft, and for multi-stage rockets which can span the globe. Here is a large rocket engine being tested in the desert on a special test-stand.

Fuels range through chemical substances, which are known as hydrocarbons, alcohols and amines. They are too numerous to mention individually, but examples include ethyl alcohol, petrol, paraffin, aniline, hydrazine and hydrogen.

These bi-propellant systems comprise three different types, each having its own peculiarities and development problems.

First there is the combination of a solid and a liquid, such as carbon sticks burning in liquid oxygen. This system is not used a great deal because liquid propellant rockets are easier to operate and fire.

Then there is the system using two liquids which are self-igniting on contact. Although this combination presents a



The latest Viking rocket, manufactured by Glenn L. Martin Company, has been launched to an altitude of more than 150 miles. It is used for research in connection with the physics of the upper atmosphere, cosmic radiation and solar radiation.

definite fire hazard in the event of bursting tanks resulting from a crash, it is favoured by many rocket engineers. Design of combustion chamber injection is simplified because a separate ignition device need not be incorporated.

Finally, there is the use of two liquids that need an ignition device, usually a pyrotechnic igniter for single shot rockets, or a small spark-operated chamber for aircraft motors which may have to be re-started during flight.

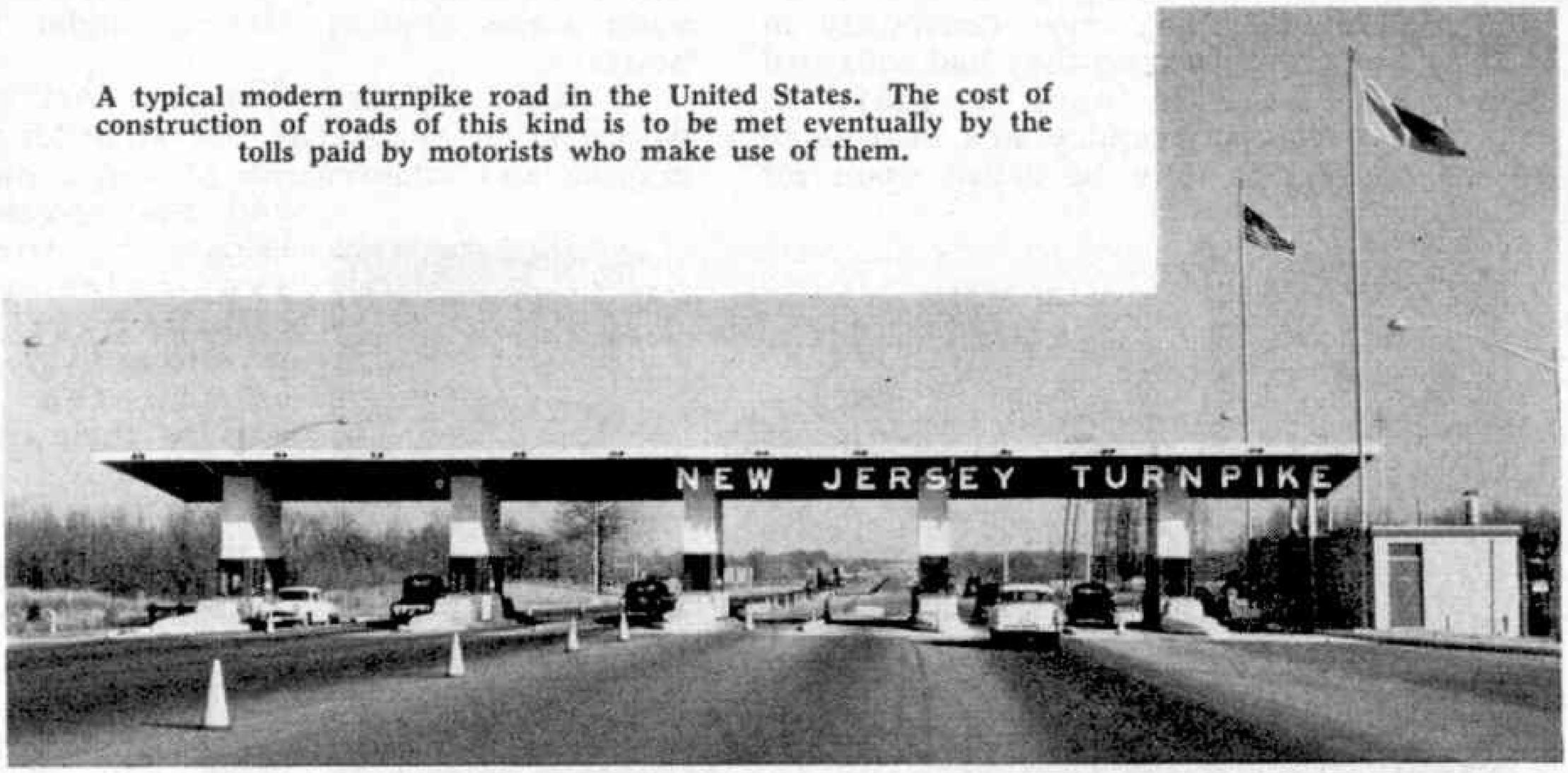
Rocket propellants are judged by what is called their specific impulse. This depends upon the temperature developed when they burn, and also upon the average weight of the molecules of the gases produced by combustion. The specific impulse is measured in seconds and if its value is multiplied by 32.2 the result gives the speed, in feet per second, at which the exhaust gases rush away from the rocket motor. So far, rocket motors have been developed to give specific impulses of about 250 seconds, which tells us that their jets must issue from the expansion nozzles at a speed of 8,000 feet per second or 5,500 miles per hour.

In addition to this specific impulse, rocket propellants are rated by a density impulse, which tells how much propellant can be packed into a given tank space. For good results, not only the specific impulse, but also the density impulse, must be as great as possible.

How fast and how far can we expect a rocket to travel? The range of a rocket projectile is governed by the velocity which has been reached when all the propellants have been consumed. This depends upon the specific impulse and the proportion of the take-off weight of the rocket which consists of propellants. Modern rockets can hold as much as 75 to 80 per cent. by weight of propellants at take-off. Taking this with the specific impulse of 250 secs., we see that a maximum speed of about 4,000 miles an hour can be reached. Such a rocket can ascend 150 miles above the surface of the Earth or can travel about 300 miles in a horizontal direction.

(*Continued on page 368*)

Our Earth looks like this when viewed from a rocket at an altitude of about 100 miles. This photograph was taken by scientists of the U.S. Naval Research Laboratory, using a special wide-angle camera mounted in a Viking rocket. More recently the Earth has been photographed from Viking No. 11 at a height of 158 miles.



A typical modern turnpike road in the United States. The cost of construction of roads of this kind is to be met eventually by the tolls paid by motorists who make use of them.

Toll or Free?

A Road Problem of the Future

By F. W. Robins

THE ever-increasing burden of modern traffic on roads that were not built to cope with it, or which it has outgrown, is raising questions as to how the difficult problem of dealing with the situation is to be met. A fairly obvious solution, which is being increasingly pressed, is to construct, as other countries have done, long trunk roads specifically designed to carry through traffic, and to leave existing roads to local or short distance use. That such trunk roads must be built sooner or later, and preferably sooner, seems inevitable. And there would be little point in providing for present volume only. We must look well ahead.

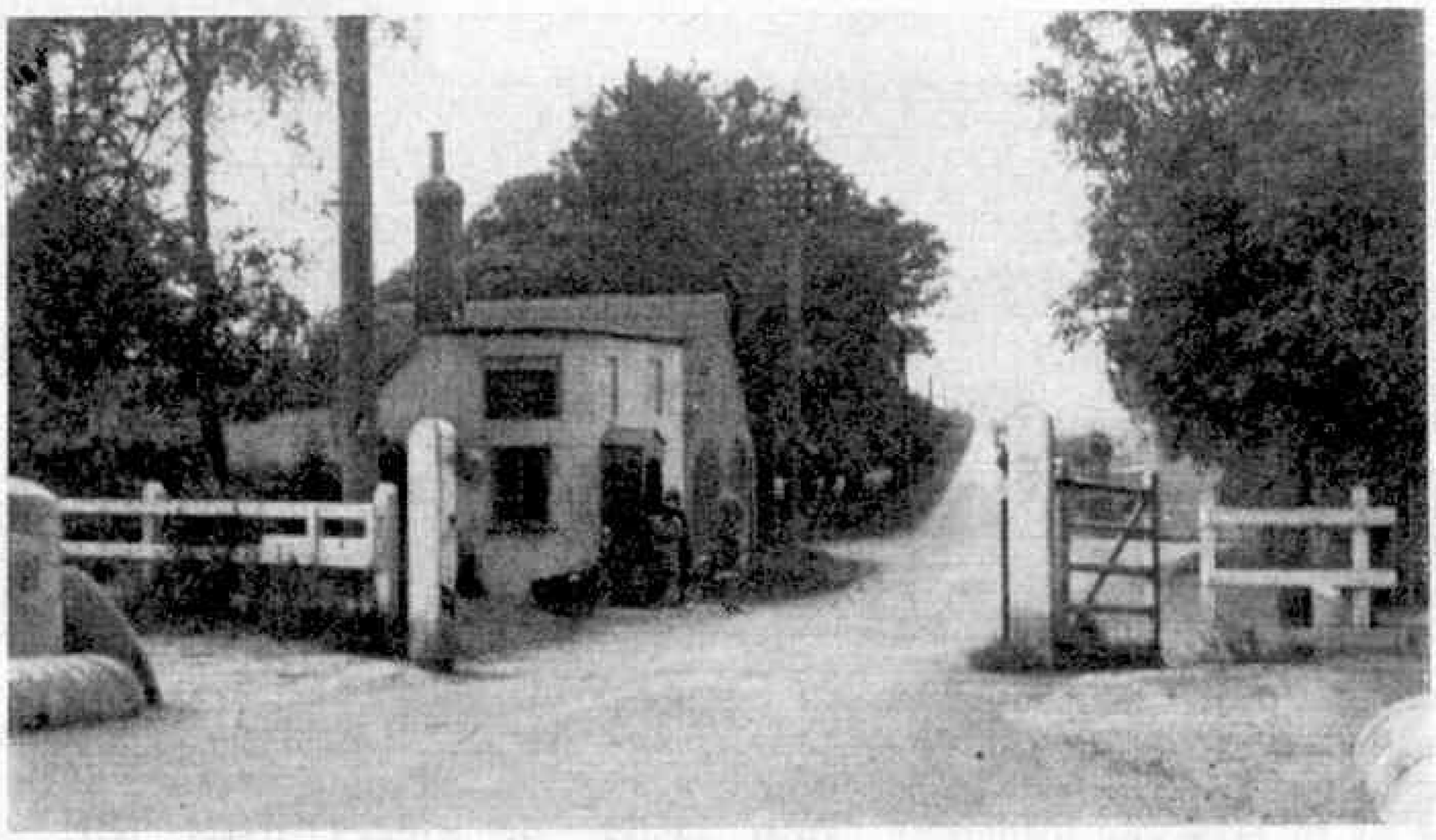
Suppose we do go ahead with such a solution. How then is it to be paid for? Local authorities, even if able, would be reluctant to finance projects that might merely help traffic passing through their areas and not benefit their own people. The heavily burdened taxpayer is reluctant to find the money for those who come after him or, at best, for a part of the community. The only alternative to raising the money by taxation or from local rates would be to finance the trunk road system by loans, and, to meet the interest on these, it is being suggested that those who use the new through roads should pay toll.

To those who make use of roads, and of bridges, this idea is nothing new; it is indeed age-old and world-wide, and it is when a new mode of locomotion comes into being, or makes itself felt, that these ideas crop up.

In the Middle Ages, the responsibility for roads was laid mainly on the land-owners, though the monasteries, enjoined by their rules to help the traveller, did a great deal, especially in building bridges and on the pilgrim routes. Labour was forced — local inhabitants had to provide man power, horses and carts, without payment, and put in their allotted days of work on roads and bridges. The corvée system, as it is called, remained in most of France even into the eighteenth century and was then one of the grievances of the French peasantry, though in England it had been abolished; in Eastern Europe it has been customary until recent times. The burden, not unnaturally, was the source of much discontent. "Why," asked the rustic population, "since the roads are mainly used by strangers and through traffic, should we work on and pay for something which is not to our own advantage?" Even in modern times the same plaint has echoed in New Guinea, for example.

Where there was any possibility of shelving responsibility or evading the work, full advantage was taken of the

opportunity, and bridges, in particular, in the Middle Ages, were constantly in the news, either because they had collapsed or they were in such a state of disrepair that an enquiry was held as to who could rightfully be called upon for maintenance. Often the decision was difficult or shirked and the upshot, more especially with regard to bridges, was a grant of pontage, under which, in return for undertaking the repair and maintenance, the grantee was allowed to charge what was called "pontage." This was a toll imposed to raise the necessary money. Unfortunately these funds were not always devoted to the purpose for which they were intended.



A former Somerset toll house, at Burrow Bridge. Passage is now free.

Perhaps this was nobody's great concern at a time when travel was a rare adventure and goods were usually carried on pack animals. But the great increase of wheeled traffic on the roads, especially from the seventeenth century onwards, brought the issue to the fore. The eighteenth century, more particularly, anticipated the twentieth in the shifting of responsibility from the smaller authorities to the larger, the counties gradually accepting more and more liability for maintenance and bridge building. In France, the process has developed to the logical institution of "routes nationales", main roads coming directly under the State.

In 1661, the first Turnpike Act was passed in Great Britain, providing for the making and maintenance of major roads and the necessary bridges by trusts, syndicates and companies of private individuals, empowered to recover their costs by erecting toll-gates and houses and levying tolls, which in some cases were farmed out. In practice, though there was a nominal term of twenty one years or so, renewals made the rights more or less permanent unless they were bought out, as most of them ultimately were. Tolls usually amounted to a penny for a horse, sixpence for a coach, eightpence for a cart, a shilling for a wagon, and so much per score of sheep, cattle or pigs. But some of the toll schedules made differences according to the number of horses or wheels to a vehicle. The tolls at Bathampton, the last toll bridge completely

Here is a section of A5, claimed to be the busiest commercial highway in Europe, passing through the village of Markyate, Herts., where it is only 16 ft. wide and the footpaths are correspondingly narrow. Photograph, "Picture Post" Library.

in Somerset—Clifton Suspension Bridge being only partly in the county—provide for bath chairs and pony chaises.

Toll trusts do not seem to have been very profitable investments, but they were thoroughly unpopular, especially in the eighteenth century, when toll keepers were often assaulted and mobs destroyed toll gates and toll houses. At Bristol anti-toll riots lasting a fortnight needed six troops of Dragoon Guards to put them down in 1749, and the military suppressed disturbances at Leeds in 1753 with loss of life. Even the threat of the death penalty failed to stop violent protests. Nevertheless, the toll system lasted well into the 19th century, despite such outbreaks as the Rebecca Riots in South Wales in 1842–3, when nearly all the turnpikes in the area were destroyed.

As late as 1875, an Act was passed enabling the Government of India to levy tolls on roads and bridges in the Presidency of Bombay. The last toll trust to control a road in this country seems to have been the Poole, Wimborne and Cranborne Trust, which had its final meeting in 1883, but 73 toll bridges still remained in England and Wales in 1937 and a few are still not freed.

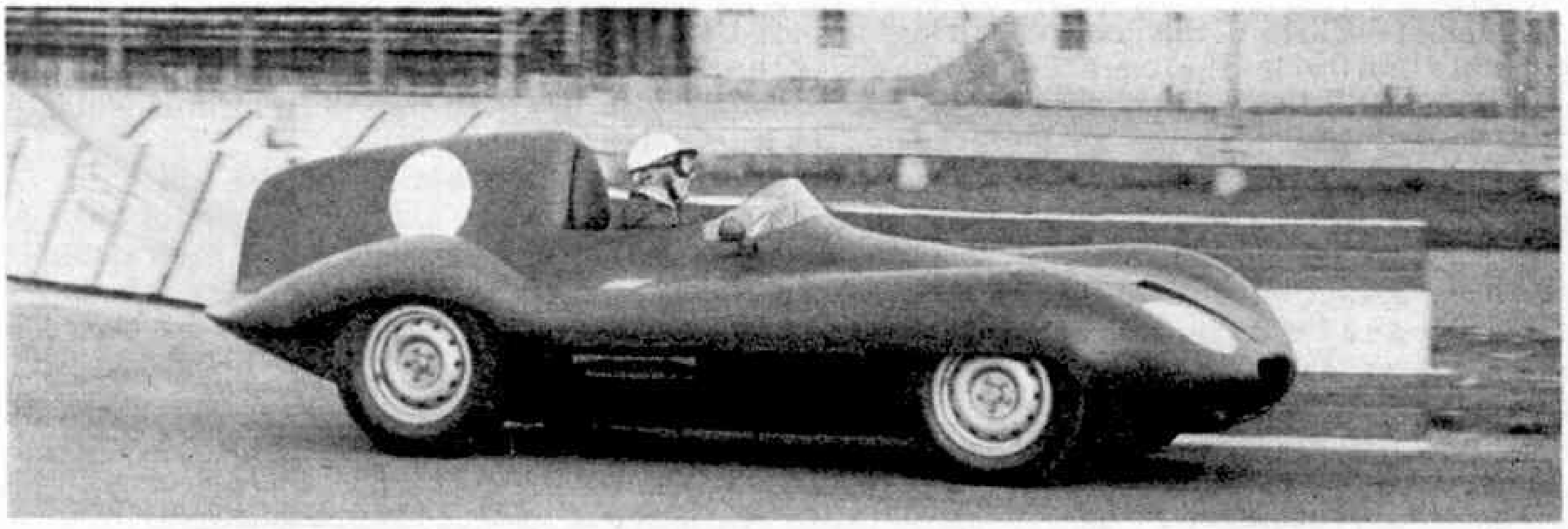
Most of the hostility to the tolls of the past arose through alleged extortions by the trusts, and the increase in the number of toll gates beyond those first authorised. No doubt private ownership was an underlying grievance, and with public ownership and safeguards, such as have been applied overseas in modern toll institutions, much of the financial objection would disappear, especially if it were understood that the impost would be entirely devoted to the upkeep of the turnpikes themselves. The principal objection otherwise was the obstruction to free passage on the road. This would be insuperable on existing roads, with the necessity for barriers at every intersection or junction, but on specially built toll roads there would be far fewer than at present. There is the successful example of the autostrada in Italy, where there are no intersections between the termini of the roads. Branch roads are only connected by loops and a toll exacted at the entry to the road covers the whole run, without hold-ups en route.

In the United States, too, the toll road system has been extensively adopted. There was initial opposition by motorists in some areas, but experience of roads where cars can move unhampered by slow traffic, and without speed limits, cross roads, traffic lights or stop signs, has converted many of them. Ten years ago the U.S.A. had less than 300 miles of major toll highways. Today, there are 1,058 miles in operation, 1,247 under construction and a further 6,232 either ready for construction or proposed.

Some of these roads have been financed by bonds having no other security than the toll road revenue; others have been guaranteed by the State, which, in the case of New Hampshire, had the advantage of securing much lower rates of interest. Texas has boldly reverted to private ownership. Two corporations, working as non-profit public utilities, are constructing toll roads, financed by forty year bonds at 4 to 5 per cent., to cover all costs. When the bonds are paid off, the turnpikes will become State property.

There are limits to the utility of toll roads. For instance, the New Jersey Turnpike, useful as it is for long distance travel, only carries four per cent. of the total traffic of the State.

A British toll-gate still in use. It is at Standlake, Oxon.



Road and Track

By Peter Lewis

THE British Grand Prix, seventh round of the 1955 World Championship for drivers and the most important fixture in the British motor racing calendar, takes place on 16th July at Aintree. The other two July Championship events are the French Grand Prix on the 3rd and the German G.P. on the 31st. The Swiss G.P. is on 21st August.

Our National "Classic", which was run for the first time at Brooklands in 1926, when a Delage took first place, has never been won by a British car or driver. The second of the series—also at Brooklands—was won by a Delage and then there was no British Grand Prix until 1948, when the Royal Automobile Club obtained the use of Silverstone aerodrome and organised the third of the series. Since then this major event has taken place annually at Silverstone—organised for the R.A.C. since 1952 by the British Racing Drivers Club.

The new aerodynamic Connaught during a trial run at Goodwood, with Kenneth McAlpine at the wheel.

This year, the R.A.C. decided on a northern venue and delegated to the British Automobile Racing Club the important task of staging the event on the £100,000 circuit at Aintree, which runs alongside the Grand National Steeplechase course for much of its length.

Mercedes-Benz are determined to avenge their defeat at Silverstone last year, but the Italian marques are just as determined to retain their post-war supremacy, and this year there should be a strong challenge from Britain.

At Silverstone I was impressed by the new Connaught, Britain's first streamlined racing car, built in the Surrey village of Send by an enthusiastic team led by designer Rodney Clarke and his partner Kenneth McAlpine.

The Connaught is powered by a 2,470 cc 4-cylinder, twin overhead-camshaft Alta engine, which it is claimed develops 240 brake horse power at 6,400 r.p.m. The compression ratio is 12½ to 1 and fuel injection is used. Fuel tanks in the large tail fin and on each side of the driver carry between them fifty gallons.

A four-speed Armstrong Siddeley preselector gearbox is positioned aft of the driver (who sits well forward with his feet on either side of the engine) and close to the rear axle.

The Connaught has Dunlop disc brakes, cooled in the front by air intakes in the nose and at the rear by ducts let into the sides of the body. Steering is by rack and pinion, requiring two turns of the wheel from lock to lock. The aerodynamic body is mounted on a tubular steel chassis with independent front suspension by two square-section tubular wishbones of unequal length on each side, and Armstrong combined telescopic damper and helical spring units.

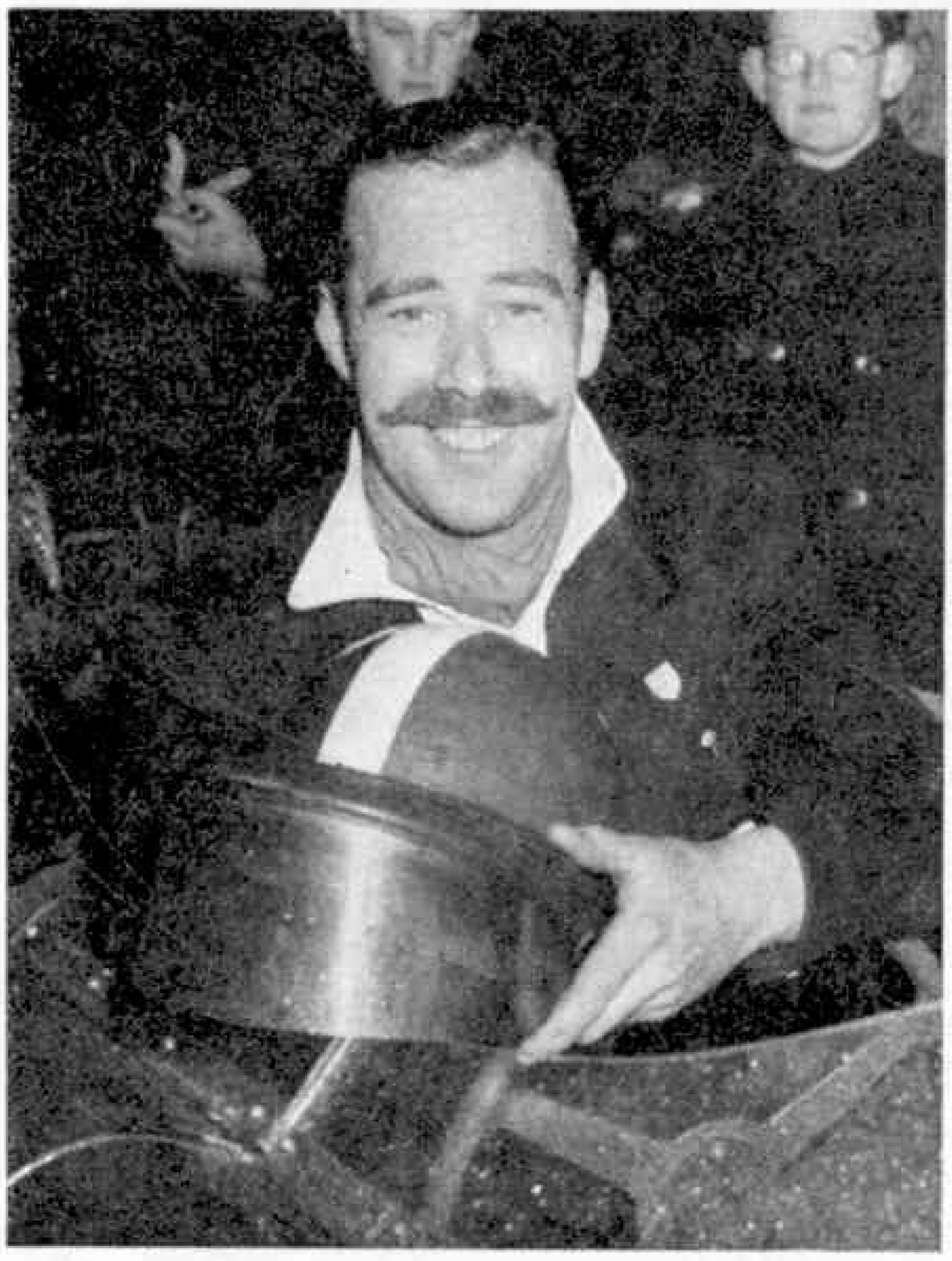
The final drive, designed by Connaught, incorporates a double reduction gear allowing variations in axle ratio up to four per cent. to be effected speedily, without dismantling the differential. This is invaluable when trying, during practice, to determine which axle ratio is best suited to a particular circuit.

At Silverstone I talked with Archie Scott-Brown, winner of the British Empire Trophy Race, whose forceful, steady driving

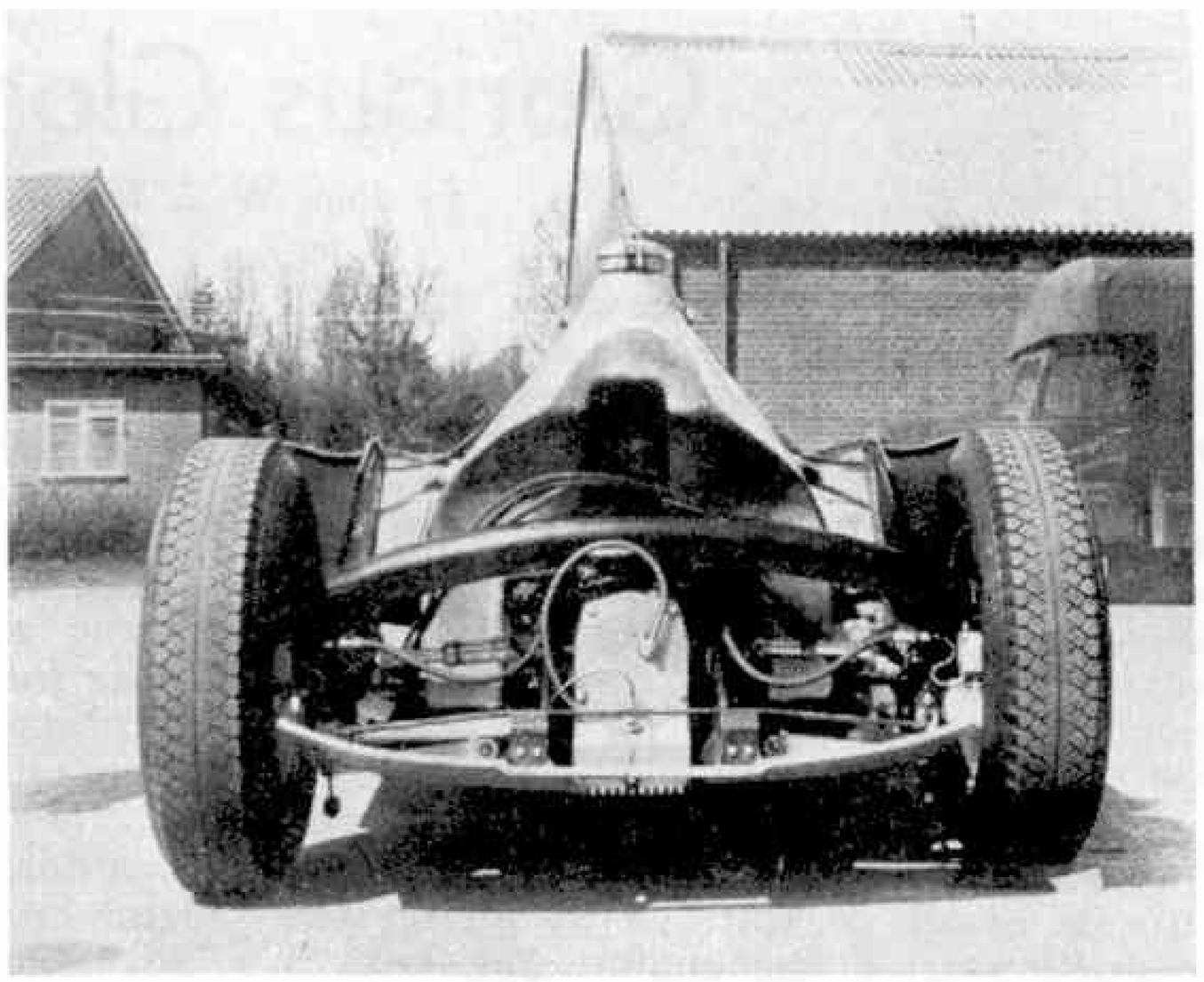
of the 140 m.p.h. 2-litre Lister-Bristol this season has delighted motor racing enthusiasts. Many people incorrectly describe him as "the one armed driver", but as he told me "It is only the fingers of my right hand which are missing. I use my right arm and the palm of my hand and the controls of the car are absolutely standard in every way."

Nevertheless, it is a disability—with which he was born—but one which does not worry cheerful, stocky Scott-Brown, who was only seven years old when his father—who raced at Brooklands—allowed him to drive for the first time in the grounds of his home. His only hobby is "Motor racing and everything to do with it. In fact I started club racing in sports cars in 1950." The ambition of this 27-year old Scotsman is to drive a Formula 1 car and to co-drive at Le Mans next year.

He is never happier than when he is chasing—and passing—more powerful cars, and the combination of his driving and the Lister-Bristol, built in a small garage in Cambridge by the Lister Light Engineering Company, is a hard nut to crack.



Archie Scott-Brown, one of Britain's most promising sports car drivers.



The rear end of the new Connaught, showing the De Dion tube.

A few weeks ago, at Langley, Buckinghamshire, the Traffic and Safety Division of the Road Research Laboratory was opened to the public. The important work carried out here by a team of 70 scientists and assistants is full of interest and of vital importance. The Division carries out investigations for the Ministry of Transport and most of the research is based on accidents. Langley has to find the cause and then suggest the remedy.

Research is based on facts such as comprehensive accident reports and statistics, which are sent to Langley from all over the country. From these data are compiled on such important safety factors as driving mirrors, safety glass, the thickness of screen pillars, the position of foot and hand controls, and driving vision. Twin rear reflectors were made compulsory as a result of experiments and surveys of accident records by the Laboratory.

A great deal of time is spent on braking and skidding. There is mobile and static equipment for measuring deceleration and braking, including a car fitted with an air pistol which fires a yellow-tipped pellet at the road when the brakes are applied, thus establishing the exact spot where braking commences.

Another ingenious device—a fifth wheel fitted to a Citroen test car—is used for skid data. The wheel is set at an angle to the direction of the car and measures sideways thrust and the degree of slipperiness of the road surface. Various types of road surface are frequently tested and records kept of their non-skid properties before and after wear.

Glorious Glosters

By John W. R. Taylor

THE "Bamel" almost missed the 1921 Aerial Derby. Three weeks before the race was due to start, it existed only in the mind of its designer, H. P. Folland of the Gloucestershire Aircraft Company. In those weeks it had been designed and built; but mechanics were still making last-minute adjustments to its powerful Napier Lion engine when the first aircraft took off from Hendon for the two-lap, 200-mile race round London.

As the last cowling panel was fastened in place, test pilot Jimmy James clambered into its small cockpit. A swing on the propeller started the engine and, with a roar, the little cream and blue racer taxied up to the starting line and streaked away in pursuit of the rest of the field. Few people doubted that the "Bamel" would win and, in fact, James collected both the speed and handicap prizes. His average speed of 163 m.p.h. over the whole course was only 3 m.p.h. less than the British record. Five months later, the "Bamel" raised that record to 196.6 m.p.h., and went on to win the Aerial Derby again in 1922 and 1923.

The Mars I (Bamel) of 1921, the first Gloster-designed aircraft.

After that there were no more Derbys; but it was by no means the end of the "Bamel's" career. By 1923, the Air Ministry were beginning to realise that air racing was more than just a sport. All the new ideas on streamlining, and the increasingly powerful engines developed for racing aircraft, were equally valuable for warplanes. Feeling it was time they showed some interest in air racing, they decided to provide some of the cash needed by British companies to design and enter seaplanes for the important Schneider Trophy contests.

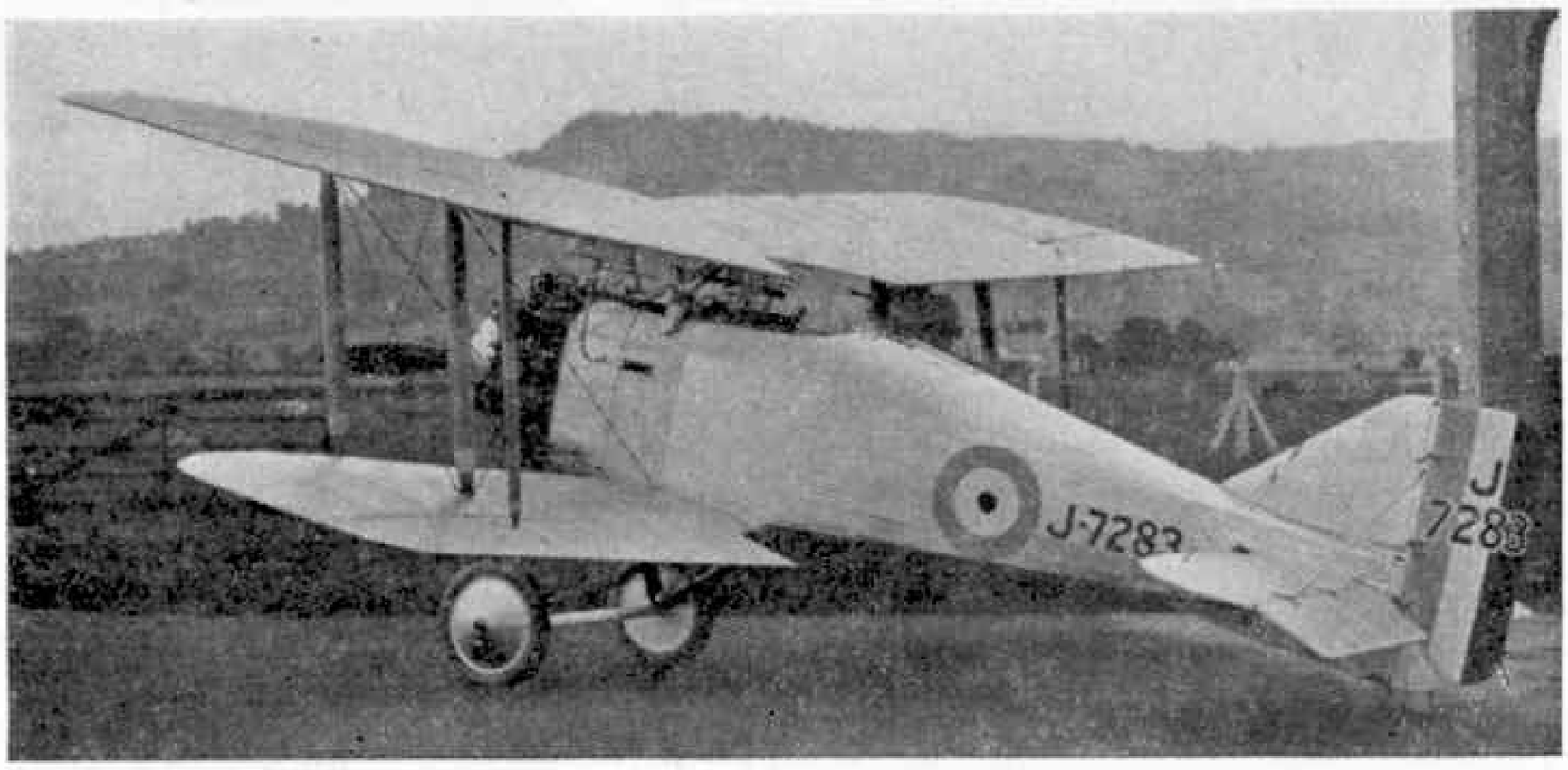
The choice of companies was not difficult. Supermarine's had represented Britain at their own expense for several years. They had won the 1922 contest with a Sea Lion flying boat, and their chief designer—a young man named R. J. Mitchell—had ideas for a revolutionary monoplane that promised to be a world-beater. The Gloucestershire Company, or "Gloster's" as they were usually called, had no experience with seaplanes; but their racing landplanes were the fastest in the country. So contracts were awarded to both Supermarine's and Gloster's for Schneider racers. At the same time, the "Bamel" was put on floats so that it could be used as a training aircraft for Schneider Trophy pilots, as it was very efficiently for three years as the Gloster I.

The rest of the story is now history. Mitchell's Supermarine S.4 seaplane set up a seaplane speed record of nearly 227 m.p.h. in 1925; only to crash before it could compete for the Trophy. But the S.5, S.6, and S.6B seaplanes, developed from it, won the 1927, 1929 and 1931 contests, gaining the Trophy outright for Britain.

The Gloster seaplanes were dogged by bad luck. The first, known as the Gloster II, was wrecked when its floats collapsed during a "landing" at Felixstowe. The Gloster III finished second in the 1925 race, which was won by America. The Gloster IV was, without a doubt, the

loveliest biplane ever built and stood a good chance of winning the 1927 contest. Its pilot, Flt. Lt. Kinkead, was lapping with clockwork precision at up to 277 m.p.h. when, one lap from the end, he had to retire with a broken propeller spinner.

Gloster's made one more attempt to win the Trophy, in 1929, this time with a monoplane known as the Gloster VI. It was very beautiful, very small and very fast; but its special Napier Lion engine had been over-boosted to give more than 1,000 h.p. Day and night the Gloster team slaved to get the engine right; but to no avail, and the "VI" had to be withdrawn from the contest.



Gloster Grebe, the first fighter fitted with a radial engine to be supplied in quantity to the Royal Air Force. It entered service in 1924.

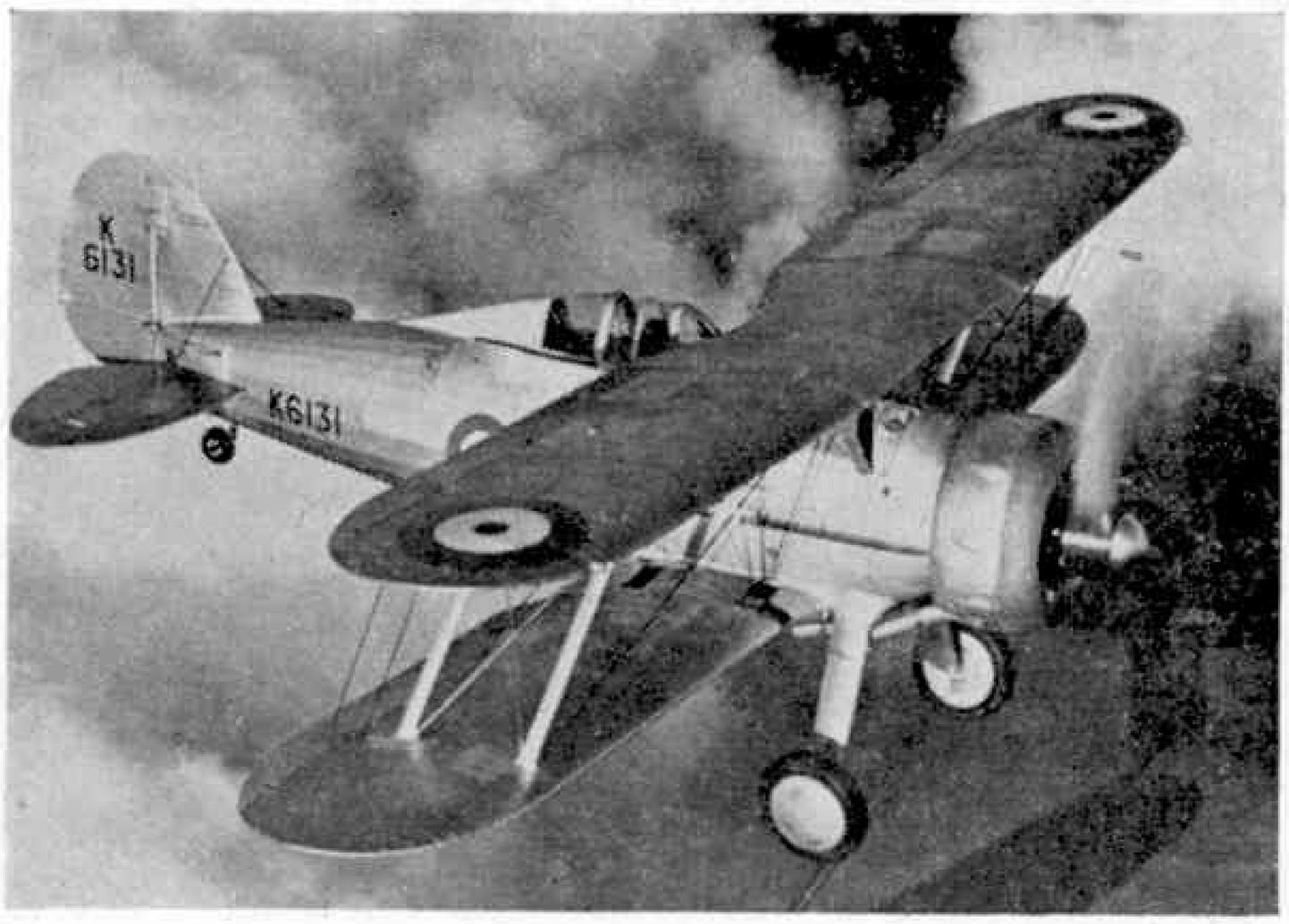
Even when it set up a new world speed record of 336 m.p.h., it was small consolation for so many disappointments, and it was 17 years before Gloster's again showed any interest in racing and records. Before skipping all those years, we must go back for a while to the start of the story.

The "Bamel" was not the first aircraft built by Gloster's. Indeed, the company is celebrating its 40th birthday this year, having entered the aircraft industry in 1915. At the time, the Royal Flying Corps was being shot from the skies over France by Germany's Fokker monoplane fighters, and all kinds of companies were called in to help build the hundreds of newer, better aeroplanes that the R.F.C. needed.

Among the newcomers were H. H. Martyn and Company of Cheltenham, whose peacetime business had included decorating the interior of luxury liners and manufacturing statues and memorials. They started modestly, by making propellers for Short seaplanes, followed by larger bits and pieces for Maurice Farman Shorthorns, and then complete D.H.4s, D.H.6s and Bristol Fighters.

In 1917 the Gloucestershire Aircraft Company was formed, to take over the aeronautical activities of Martyn's; and, at the end of the 1914–18 War, the directors decided they liked the aircraft business well enough to stay in it.

It was a bold decision, for all Government contracts had been cancelled when the fighting stopped, and several of the biggest aircraft companies had been put out of business. Among them was the Nieuport Company, maker of some of Britain's fastest and most efficient fighters. So Gloster's decided to buy much-needed experience by



The Gloster Gladiator was the last biplane-type fighter operationally employed by the R.A.F.

taking over Nieuport designs and obtaining the services of the company's chief designer, H. P. Folland, and many members of his staff.

With hundreds of brand-new wartime aircraft still in store, the Air Ministry showed little interest in buying new warplanes. Gloster's considered that the best way of creating interest would be to build a first-class racing aircraft, with the most powerful engine available, and then offer it as the prototype for a fighter. So they built the "Bamel" or, to give it its proper name, the Mars I.

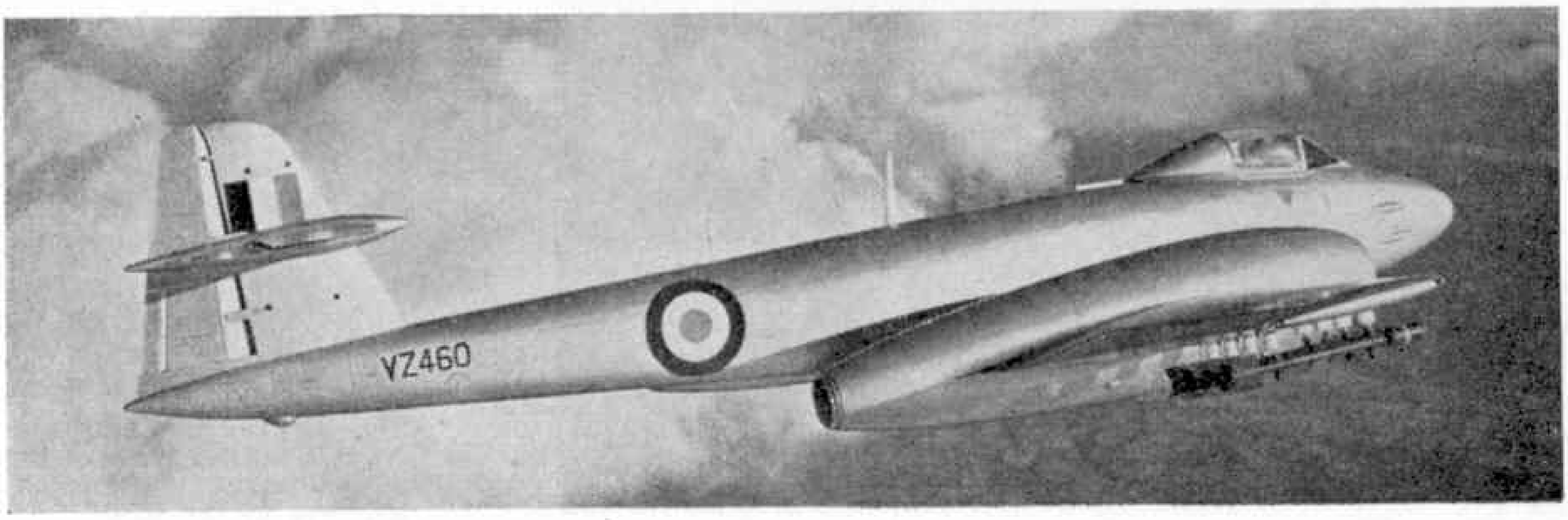
The idea worked. First of all Japan bought 50 Gloster Sparrowhawk fighters. Then Greece had 25 Nighthawks; and finally the Air Ministry bought two Nighthawks for operational trials in the Middle East, and 22 Nightjars for service with Coastal Area and aboard the Navy's primitive aircraft carriers. All these machines were basically Nieuport Nighthawks, with new wings, undercarriages and other changes. And all were originally named Mars; the Sparrowhawks being Mars II, III and IV, the Nighthawk the Mars VI and the Nightjar the Mars X.

But Gloster's did not concentrate only on fighters. In the middle '20s, they flew a tiny 7 h.p. lightplane called the Gannet, and two single-engined reconnaissance bombers named Goral and Goring. Later came the twin-engined A.S.31 civilian air survey aeroplane; and a huge, four-engined, 30-seat troop carrier to Air Ministry Specification C16/28; as well as many experimental machines.

The A.S.31 completed a highly successful survey job in Africa; but none of the others progressed beyond the prototype stage. The troop carrier even got off to a bad start; because, when completed, it was too tall to get out of the hangar. In the end, trenches had to be dug for its wheels to run along, before it could be towed out for its first flight.

Britain's first jet-plane was the Gloster-Whittle E28/39, of 1941, shown above. Meteor jet fighters are still used by the R.A.F. and many other air forces. The Mark 8 version is illustrated below.

But Gloster's heart was always in fast single-seat aircraft, and it is for their fighters that they have become world famous. The machine which first put them in the front rank of international fighter firms was the Grebe, which entered service with the Royal Air Force in 1924. Powered by a 400 h.p. Armstrong Siddeley Jaguar engine, its top speed of 153 m.p.h. and sturdy, aggressive lines made it the sensation of the 1925 R.A.F. Display at Hendon, where No. 25 Squadron performed formation aerobatics in Grebes.



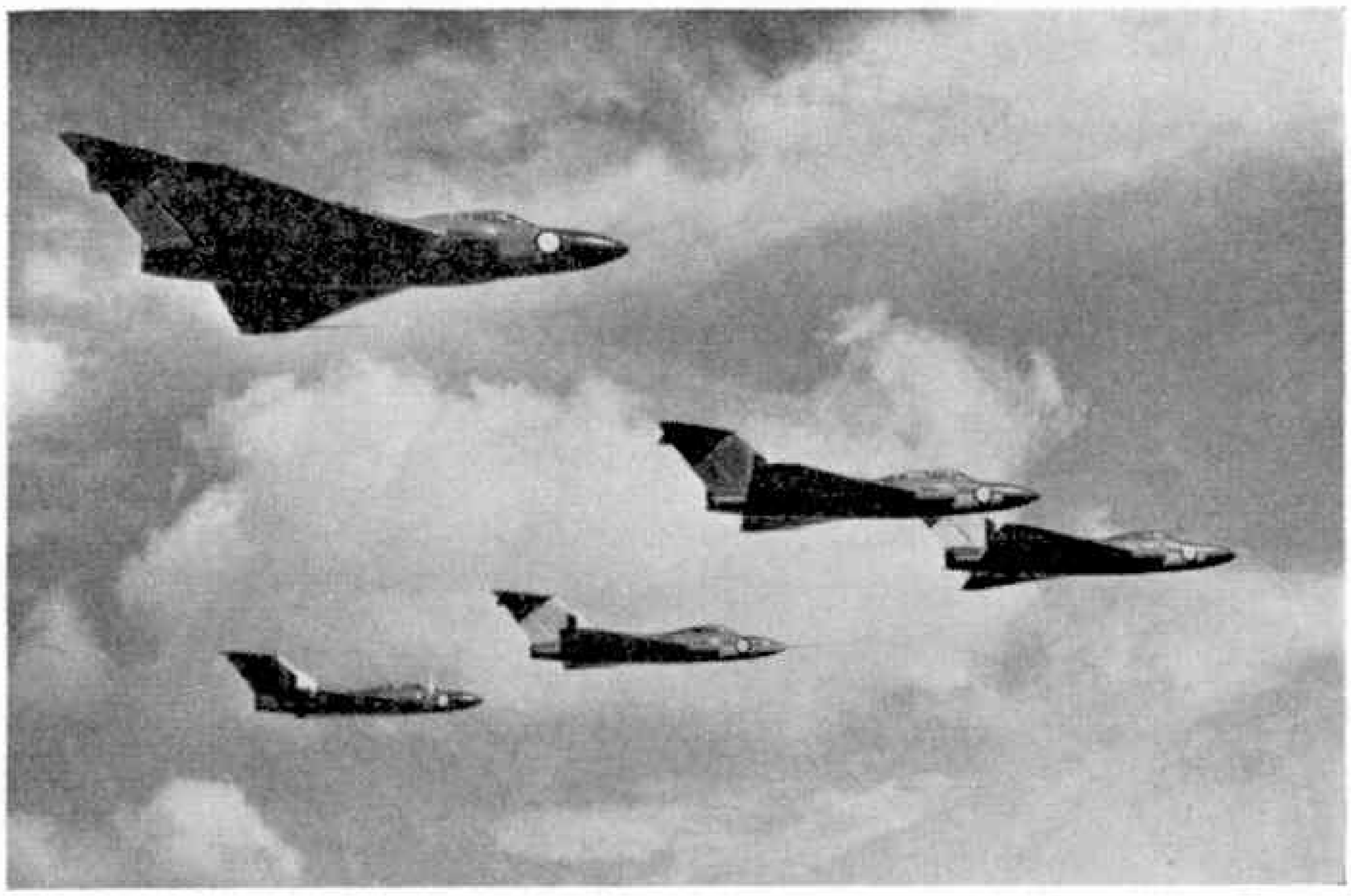
Like most Gloster fighters, they were delightful to fly, and were used for all kinds of experimental work. Two were carried under the airship R33 and released in flight, to test the suitability of airships as flying aircraft carriers. Another was pulled sharply out of a 240 m.p.h. dive by an R.A.F. test pilot to prove the strength of its structure—the first time any British aircraft had been subjected to such a severe test.

Altogether 130 Grebes were built for the R.A.F., followed by 90 Gamecocks, which were faster and more manœuvrable, being powered by the new 450 h.p. Bristol Jupiter. On the strength of these successes, the Gloster Aircraft Company (the old name of "Gloucestershire" had been dropped in 1926) began to move their offices and workshops to a fine new factory at Brockworth aerodrome, near Gloucester. It became eventually one of the largest aircraft factories in Britain; but things did not always go smoothly. Several promising aircraft, such as the Guan and Gnatsnapper fighters, were "killed" by engine troubles. Contracts to build other people's aircraft helped; but between times Gloster's had to turn out such things as motor car components, milk churns and fish fryers, to keep their workers busy.

Even in the blackest days, they continued to design newer and better fighters, and their fortunes changed in 1933 when they won a big contract for the Gauntlet. Its design had started in 1928 as the S.S.18, progressed through the S.S.19 which was called the "Multi-gun" as it carried no fewer than six machine-guns, and ended up as the Gauntlet with two guns and a 560 h.p. Mercury engine.

It was the first Gloster all-metal aircraft adopted by the R.A.F. and proved an immediate success. By 1937 there were 14 Gauntlet squadrons. Even more important, a refined, faster, more powerful development called the Gladiator was also beginning to enter service in fair numbers.

There is no need to recall in detail the achievements of these splendid biplane fighters in World War II. Gladiators shot down the first enemy aircraft destroyed over Britain; fought bravely against hopeless odds from a frozen lake in Norway and helped to destroy the Italian Air Force in North Africa. The "navalised" Sea Gladiator version equipped Malta's gallant "Faith, Hope and Charity" flight, which defied the whole might of Mussolini's air force in the summer of 1940.



Javelin F. (A. W.) Mk. 1, the world's first twin-engined delta fighter.

Except for the Gladiator, Gloster-designed aeroplanes saw little service in the war. But the company had amalgamated with Hawker Aircraft Ltd. in 1934 and later became a member of the great Hawker Siddeley Group. One result was that Gloster's built no fewer than 2,750 of the Hawker Hurricanes that helped to win the Battle of Britain and many later campaigns, followed by 3,330 Hawker Typhoons.

Whilst doing so, their own design staff, headed by W. G. Carter, who had succeeded Folland in 1937, was working on the most revolutionary aeroplane ever built by the British aircraft industry. That aeroplane—the Gloster-Whittle E28/39—was Britain's first jet-plane when it flew on 15th May, 1941, and it can still be seen in the National Aeronautical Collection (*Continued on page 368*)

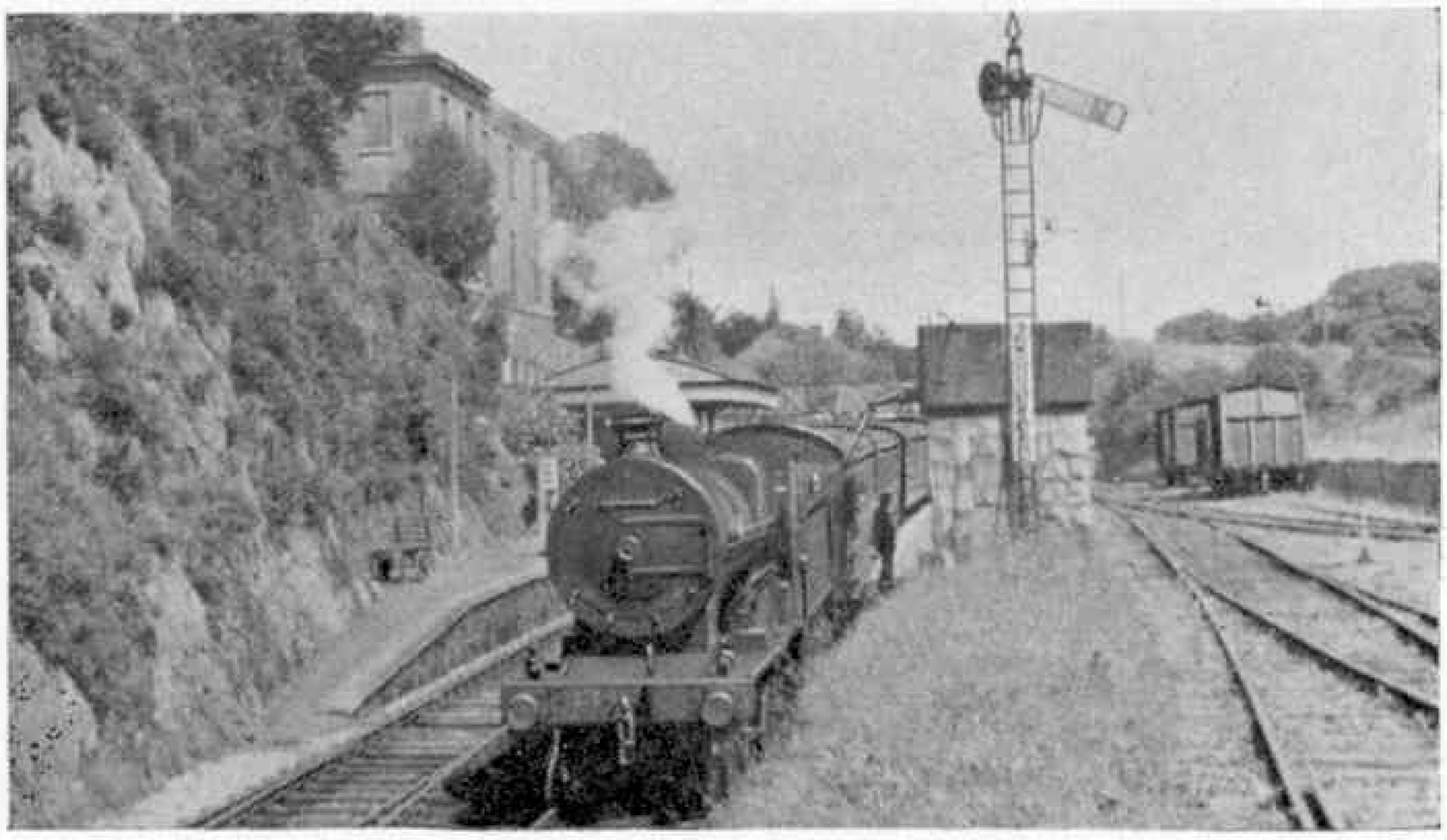
Railway Notes

By R. A. H. Weight

Locomotive and Rolling Stock Building Plans

British Railways announce that 196 new steam locomotives have been ordered at Brighton, Crewe, Darlington, Derby, Doncaster and Swindon Works, together with 12 Great Western type 0–6–0 tanks from the Hunslet Engine Co., Leeds. The majority will be of B.R. standard mixed traffic design as already in service, including 4–6–0s of classes 4 and 5, class 2 and 4 2–6–0s, class 4 2–6–4T and class 3 2–6–2Ts. Fifty-three heavy freight, class 9 2–10–0s are on the list, including Nos. 92020–9 previously announced, as well as 15 more of the 16xx light 0–6–0Ts to be built at Swindon.

Large scale construction is to continue of the B.R. diesel-electric 0–6–0 shunting engines, which will become familiar in more and more freight yards, as 70 are to be constructed at Derby and 40 at Darlington. Locomotive building firms are to provide five 0–4–0 diesel-hydraulic engines of 200 h.p. and three 0–4–0 diesel-mechanical of 150–165 h.p. with 26 others of 200 h.p. type. Thus another 144 diesels will be coming along. Drawings and parts in some cases will be prepared at other B.R. Works.



C.I.E. 4-4-0 No. 334 on a Rosslare train takes water at Rathdrum. Photograph by D. Chaplin.

The present programme comprises 135 multiple unit diesel passenger coaches, and 360 multiple unit electric ones, which can be coupled together in powered sets of two or more as required. Over 1,000 passenger carriages of various kinds for use in steam trains will be built, together with 21,300 wagons for freight service. Many more are intended within the next few years and firms in various parts of Great Britain will be sharing in this important constructional work.

The Next Diesel Passenger Routes

Within the next year or two multiple unit diesel sets should be operating in many areas, providing in most cases faster and more frequent services than are now afforded with steam traction. Express diesels are to run between Edinburgh and Glasgow, Birmingham and Swansea and London and Hastings. Of a more local character, though including journeys of considerable distance, will be those in East Anglia, Lincolnshire, Newcastle–Hexham–Carlisle, Newcastle–Sunderland–Middlesbrough, Manchester–Crewe–Stafford–Buxton, Birmingham–Lichfield and other local destinations and in North Wales and Hampshire.

Main line diesel locomotives for hauling all kinds of trains are to be ordered and given extensive trial. They will be of three main types known to begin with as A, B, C, exerting respectively 600–800, 1,000–1,250 and 2,000 or over horse power. They will be operated over a number of routes as required or decided later.

Climbing the Lickey

One of the steepest gradients of its kind on a British main line is the Lickey Incline. This extends for well over 2 miles, mainly at a gradient of 1 in 37½ against northbound trains from the Cheltenham or Worcester direction towards Birmingham, on the L.M.R. (former Midland Railway). It is usual for all but the lightest trains, consisting of just a few carriages or wagons, to stop at Bromsgrove station, Worcestershire, for banking assistance in rear. Sometimes two 0–6–0Ts do the necessary pushing instead of the big 4-cylinder 0–10–0 now numbered 58100, specially built for this duty in 1919. This was exerting full power at the rear of a special express, weighing about 360 tons, in April last, that was full of railway enthusiasts of whom I was one. For the first time in those parts, the train engine was a W.R. Castle—No. 7017 *G. J. Churchward*, which had worked through from Paddington via Bristol —and an impressive climb was made in a little over 6 min. with speed rising to 26 m.p.h.

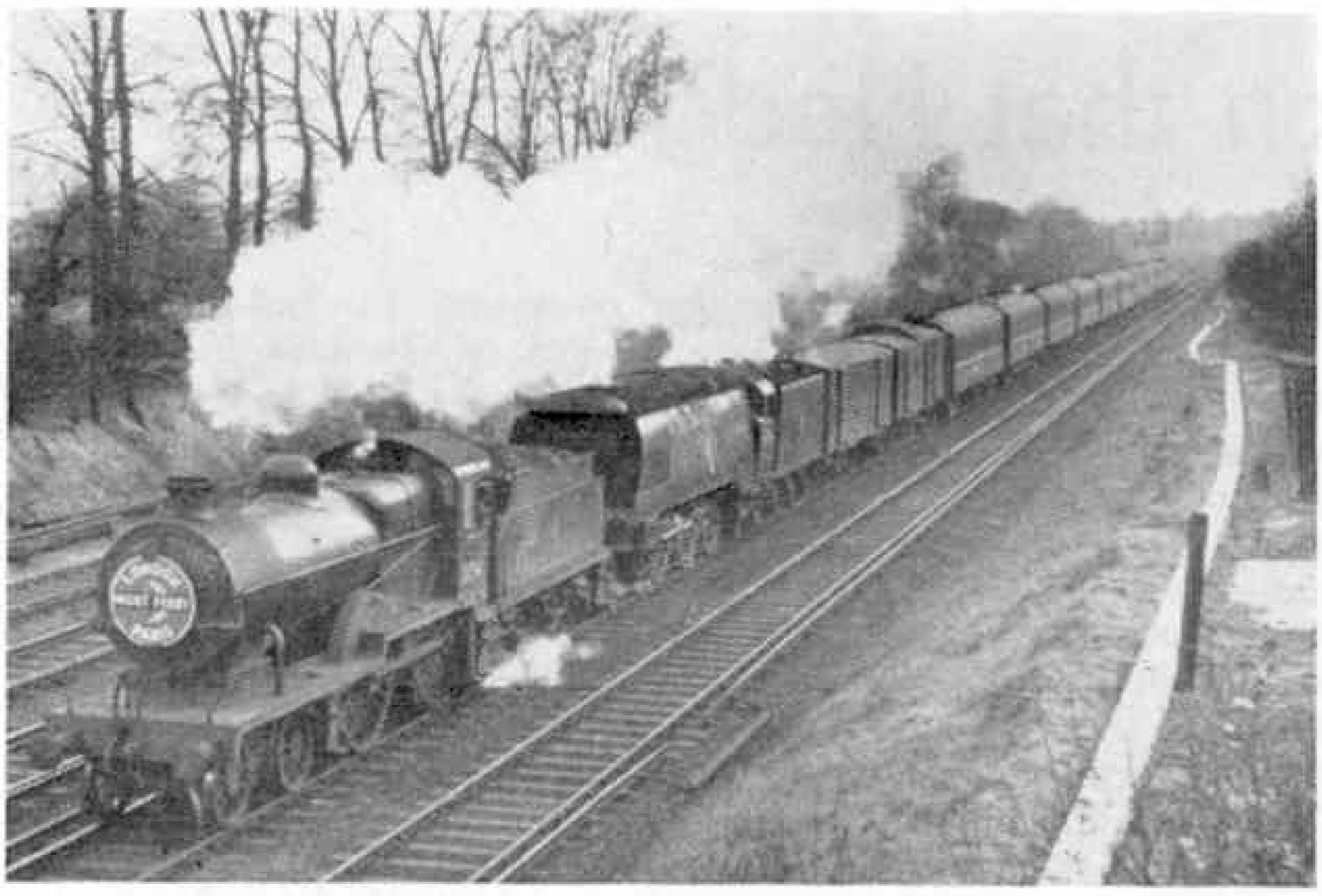
Shortly before that some trials had been made of unassisted ascents that on the whole were successful, including stops and starts at the foot or on the way up. Class 5 4–6–0 No. 44776 had a 7-coach load. Class 6 3-cylinder Jubilee 4–6–0 No. 45554 *Ontario* took one coach more. A dynamometer car was included in each case.

Amazing French Speed Record

As briefly reported in these notes last year, the French National Railways set up a world's maximum rail speed record in 1954 when a CC electric locomotive hauling three coaches as a trial special attained 151 m.p.h. on straight and almost level track. It is now known that preparations had been going on for twelve months for an attempt to go much faster still, and in March last CC No. 7107, which had been streamlined and fitted with solid monobloc wheels to reduce resistance, averaged over 185 m.p.h. for 7 miles, touching the astonishing maximum of 205 with a similar test special!

Next day this outstanding performance was repeated by a lighter BB type locomotive No. 9004, a 4,000 h.p. continuous rating machine built in 1953, having eight wheels and weighing 80 tons. The CC type weighs 106 tons and is rather more powerful, being mounted on two bogies each with three driving axles.

The runs were made on the Bordeaux–Dax, 1500 D.C. line. To boost up the power available, mobile sub-stations were brought to the scene, and a maximum of 12,000 h.p. was developed. Specially tough pantographs were designed and fitted, though it is reported that owing to the tremendous friction even these began to melt!



The "Night Ferry" through train from Paris heads for London behind S.R. 4-4-0 and 4-6-2 locomotives. Photograph by B. C. Bending.

There is no intention to operate anything like such speeds regularly, as this would not be an economical proposition, though it amply proved what progress has been made in the design of electric locomotives and overhead equipment in France and is also a tribute to the quality of the track traversed.

The world record maximum with steam is the 126 m.p.h. attained in 1938 by L.N.E.R. *Mallard.*

Southern Tidings

The *Night Ferry* expresses are unique in Britain, as they convey through London–Paris sleeping cars and baggage vans, which are shipped aboard specially equipped steamers for the Dover–Dunkirk sea passage, which can also carry freight wagons and motor vehicles. The inward train from Dover to London (Victoria) on weekdays usually runs via Faversham and Chatham, a more severely graded route than the Tonbridge–Ashford one. With six heavy international sleeping cars, ordinary carriages, buffet and restaurant cars, and vans, the gross train weight is often well over 500 tons. The normal locomotives used by the S.R. in each direction are a light Pacific and a L1 4–4–0 as a double-headed combination, so that these early morning and late evening expresses are exceptional in several ways!

Well over 50 diesel-electric 0–6–0 shunting engines are included in S.R. stock, with more coming into service. For maintenance they are chiefly divided between Hither Green, Norwood, Brighton, Feltham and Eastleigh sheds, but they also work at Bricklayers' Arms, Plumstead, Tonbridge, Maidstone, Ashford, Gillingham, Nine Elms, Horsham, Three Bridges, Chichester, Basingstoke and in Southampton yards. They are often out for a fortnight at a time, running back to depot for servicing as light engines at night during week-ends. Sometimes they make main line or other runs at low speed in charge of permanent way repair or materials trains, and they have also been used to haul especially heavy and awkward loads of machinery conveyed as freight by special train.

London Midland Locomotive News

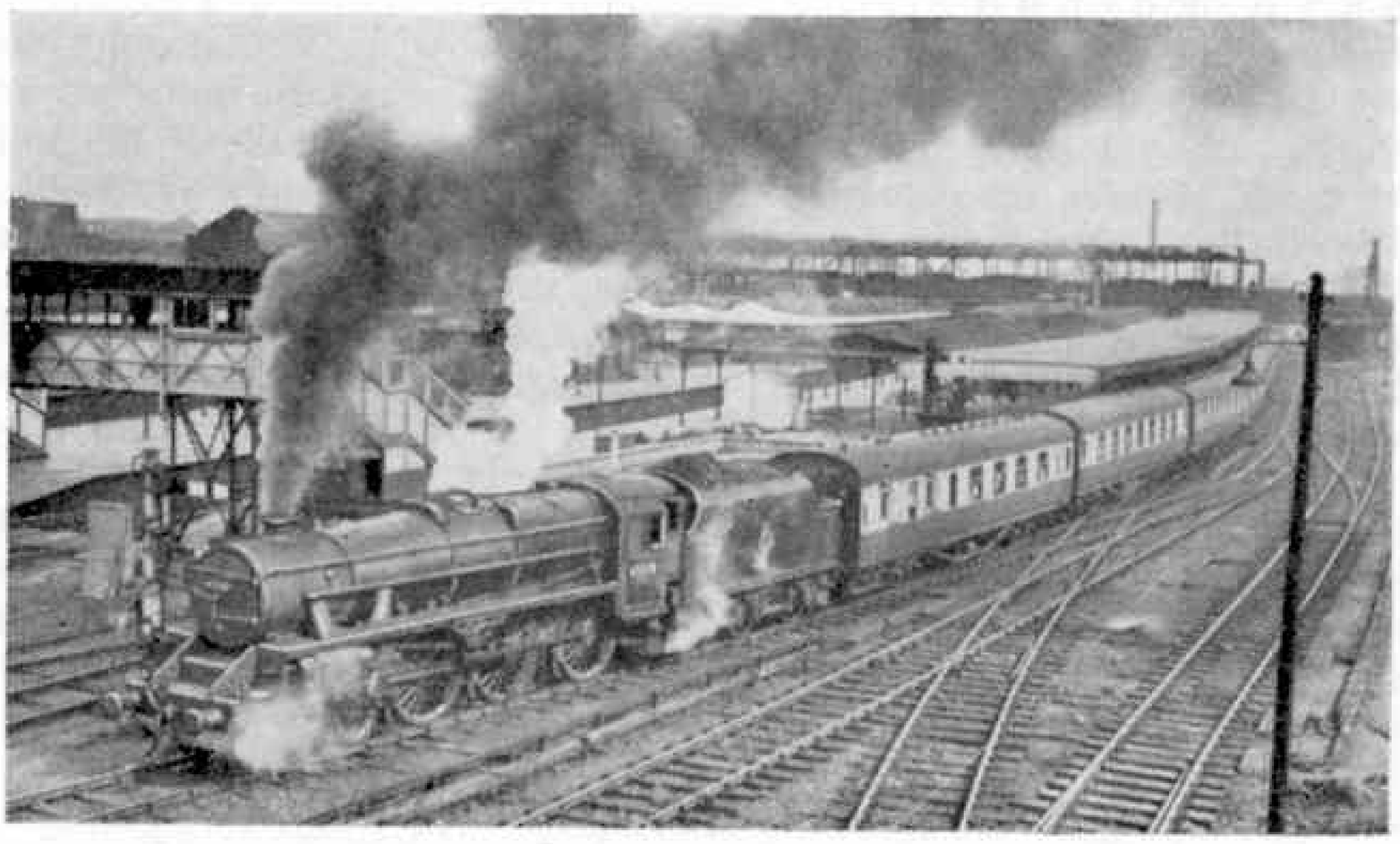
The large 4–6–2 No. 46237 *City of Bristol*, of Camden shed, has been on loan to the Western Region and running in charge of Old Oak crews on various express turns to and from Paddington. Improved services are operating between St. Pancras, Luton and Bedford with an increased share in the semi-fast haulage being taken by new class 4 4–6–0s. The 2–4–2T No. 50621, lately withdrawn, which was actually the first locomotive built at Horwich, in 1889, is to be preserved as a representative of a long-lived and successful Lancashire and Yorkshire Railway design used for many duties.

S.R. type main line diesel No. 10202 was reported on the up *Midday Scot* from Crewe in May last. No. 10100, the Fell 4–8–4 diesel mechanical locomotive, has continued passenger train running over the steeply graded Manchester–Derby route.

At Derby Works recent new construction has included class 5 4–6–0s Nos. 73075-7 for the Scottish Region, with others to follow. At Crewe the 2–10–0s with Franco-Crosti boilers, numbered in the series from 92020 upward, are well in hand. Compound 4–4–0 41091 has been condemned, but No. 41078, evidently in better general condition, received a general repair at Derby.

More Colour Lights on S.R.

As I have observed while travelling, and also heard from Mr. J. Edlin, colour light signalling has been brought into use in Surrey between Croydon and Coulsdon North, so displacing the only stretch of semaphore signals remaining on the 51-mile London–Brighton main line via the Quarry route. Instead of seven old-type signal boxes, three new electrically operated ones at East Croydon, South Croydon and Purley control the extremely busy 4½-mile multi-tracked section now affected, along which there are several junctions and crossover lines. Some of the intermediate signals are operated automatically.



A through express from the South to the Midlands leaves Willesden Junction behind L.M.R. No. 45310. Photograph by R. Russell.

Watch that Hedgehog

By Garth Christian

FIVE times in a single week, strange sounds in the middle of the night have robbed me of sleep; five times I have wondered why people persist in calling rural England "quiet," when the country nights are so noisy. Once it was the honking cries of the wild geese sweeping across the face of the moon which disturbed my sleep; another time the culprit was a tawny owl who, using the roof above my bedroom as a perching post, announced his presence with a raucous "Hoo-hoo-hoo-hoo." A badger, grunting loudly as he scratched at the lawn, wakened me one day; but the most noisy night intruder of all was the so-called "silent" hedgehog.

No one who has had the misfortune to hear the child-like cries of a trapped hedgehog will ever forget it. More often the hedgehog wakens me by his snorting and grunting, and his clumsy clattering of plates and saucers as he eats his midnight meal. For though my garden grows flowers and fruit and superb crops of weeds, it is primarily a place of birds and wild mammals.

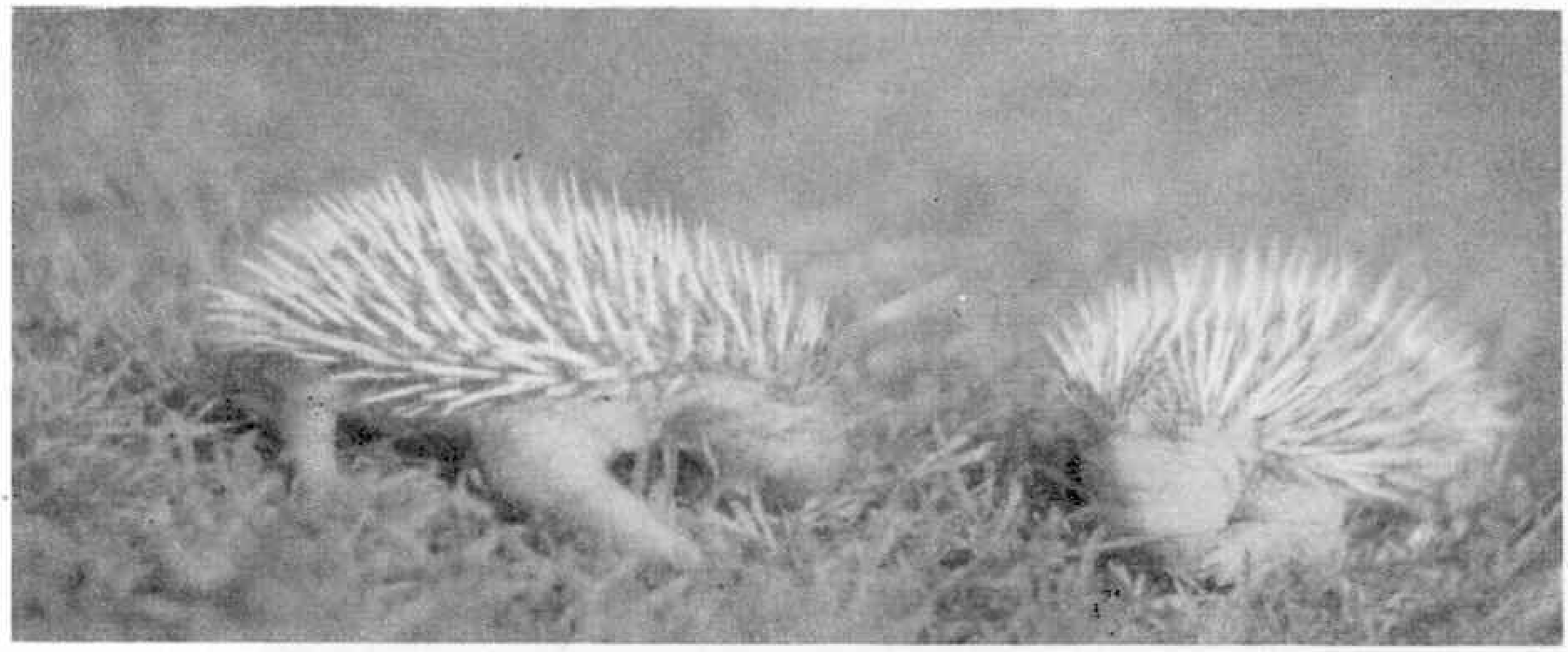
For years the tits and nuthatches have helped themselves to rich supplies of fresh food on the well that does duty as a bird table. Then I noticed that food left there at dusk always disappeared before dawn. Windfall apples lying on the lawn bore tiny teeth marks. I placed some milk beside the well and by the morning it had gone. The hedgehogs were faring well at my expense!

Soon it became a nightly event to hear the grunting and snorting of two hedgehogs —I called them Eyre and Spottiswoode— as they ambled out of their daylight hiding place beneath the brambles and dead leaves edging the wood, and made their way on to the lawn. Like that of most wild creatures, the hedgehog's life seems to be governed by habit. Every night Eyre and Spottiswoode follow the same route, visiting the well to drink milk and eat odd crumbs of bread or meat left by the birds—they are particularly partial to best mutton—before moving along the wall of the terrace and out into the vegetable garden.

I do not grudge the hedgehogs this nightly outing among the peas and the parsley, the carrots and the onions. For the hedgehog is a merciless foe of grubs and snails, and is fond of harmful beetles and caterpillars. And if he offends by eating too many earthworms and the eggs and young of small ground-nesting birds, he atones for it by eating mice.

Yet though the hedgehog is among the most common of our mammals, little is known of his habits. We may live within twenty yards of a hedgehog's hideout and never know it, for not until dusk does he usually venture out into the dangerous world, where his worst enemies are the fox, the badger—and the gipsy. A few bold terriers, too, are capable of killing him.

The young urchins—there are usually five of them, and sometimes as many as seven or as few as three—are all too eager to leave their nursery, often sited in a rabbit warren. They are blind at birth and only an inch long, and their soft, white prickles are no defence against



the aggressive dog or fox. Perhaps that is why their mother is loth to leave them at home. As soon as they are capable of moving far, she takes them with her on the nightly excursions in search of grubs. A tame hedgehog will even bring her family into the house, where they may welcome milk offered through a fountain-pen filler. But a hedgehog in the house has one drawback; more than most creatures, they seem to attract vermin, and a sound "guestimate" of a hedgehog's flea population amounted to three per prickle.

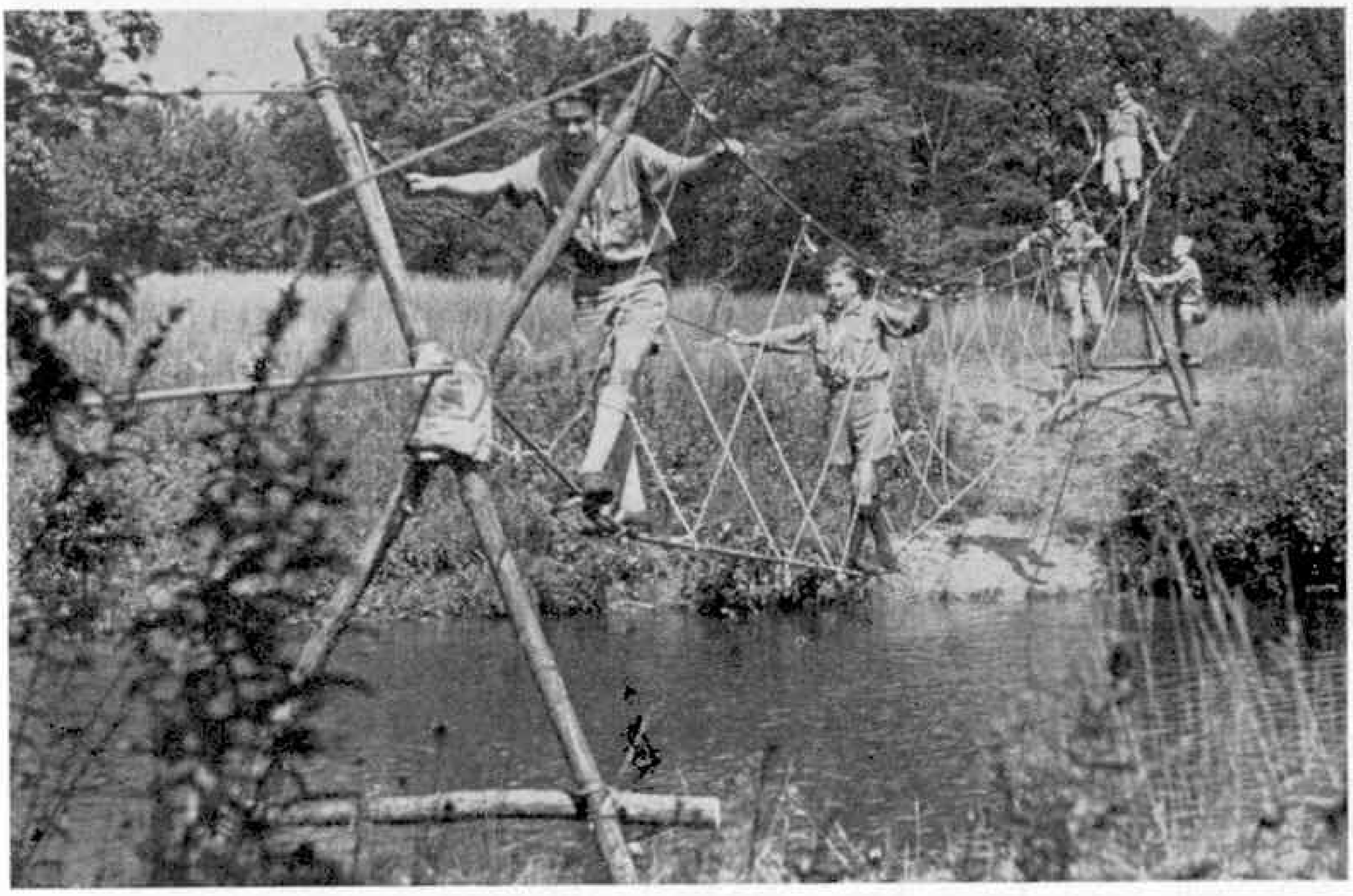
Not that the hedgehog is strict in conforming to the calendar. Mild weather will persuade him to emerge from his frost-proof layer of leaves and brambles and wander along the hedgerows in search of insects even in winter. It is not surprising, perhaps, that a rotting apple or a few dead leaves may happen to become impaled on his protective spikes at this season of the year. Hence the quaint belief that he deliberately transports apples in this way.

The hedgehog and his ways are not as well known to us as we should like, perhaps because he emerges from his lair only at dusk, and enjoys a midnight meal. The pictures of hedgehogs on these pages, including that of two young animals above, are from photographs by C. Eric Brown.

Are hedgehogs particularly sluggish when the first fair weather of late Winter or Spring brings them out of hibernation? To judge from the appalling numbers run over on our main roads at that season, it looks suspiciously like it. On a single mile of main road in Sussex, I counted five hedgehog corpses in a single season, and I may well have missed others. The motor car must be classed with the badger and the fox as their most powerful enemy. Rabbits, squirrels and badgers also fall victim to cars, but never in such numbers, for the hedgehog's method of defending himself by rolling into a ball and lying still is fatal when the enemy is a car. Will the day ever come when a few hedgehogs, realising that the best form of defence is to keep on moving, produce a car-conscious strain of animals?

If the growing traffic on the roads is bringing a quick death to increasing numbers of hedgehogs, the absence of persecution is helping them. In Victorian days, hedgehogs were sold wholesale at 8s. to 12s. a

(Continued on page 400)



A monkey or rope bridge built by American scouts.

Timber and Rope

By E. E. Reynolds

WHEREVER you find Boy Scouts—and that means in any one of some sixty countries—you will notice how keen they are on constructing bridges, towers and so on out of timber. The only fastenings they use are of rope. You probably know that one of the first parts of a Scout's training is the tying of knots. From that he goes on to learn how to make lashings, or the right way of fixing one piece of timber to another.

If you try to tie one pencil across another with string, you will soon discover that this is not an easy matter; it looks simple, but unless you know how to do it, your pencils will wobble about and soon come loose. So the first step in timber construction is to learn the most commonly used lashing—the square lashing. When properly done, this is very firm and will not work loose. In the days when scaffolding was tied by ropes, the square lashing was the one most frequently used, and a workman on scaffolding was the best instructor you could find.

This is one of the things it is almost impossible to learn from a diagram, but if you look at the pictures here you will see square lashings wherever one pole crosses another at right angles.

One other lashing is necessary. This is for use when one pole crosses another diagonally. Such crossings are needed to brace the structure and to make the whole erection rigid.

The most interesting structures are bridges across streams that are too wide to allow for planks or big timber. A bridge of this kind is shown in the first illustration. It is a rope or monkey bridge, and this one was made by American Boy Scouts.

Diagonally crossed poles, or sheer-legs, each rather like an enormous pair of scissors, are first fixed on each side of the stream. These have to be very firmly anchored, as they have to take a great deal of strain, and the method of anchoring is by a series of pickets, with lashings from one to the other. The main rope, the footway, runs over the V-shaped crossing of the poles. This rope too has to be firmly anchored, and means of tightening it also are required. This is best done by a block and tackle. It is always surprising how much a rope gives and sags when any weight, such as that of a man walking along it, is added.

The upper parts of the arms of the sheer-legs are used for tying the hand rails. To keep these apart, and to steady the footway, these two hand rails are fixed at intervals by short poles tied to them and to the footway.

Bridges of this kind seem very wobbly at first, but they are, in fact, in common use in many jungle areas and sometimes

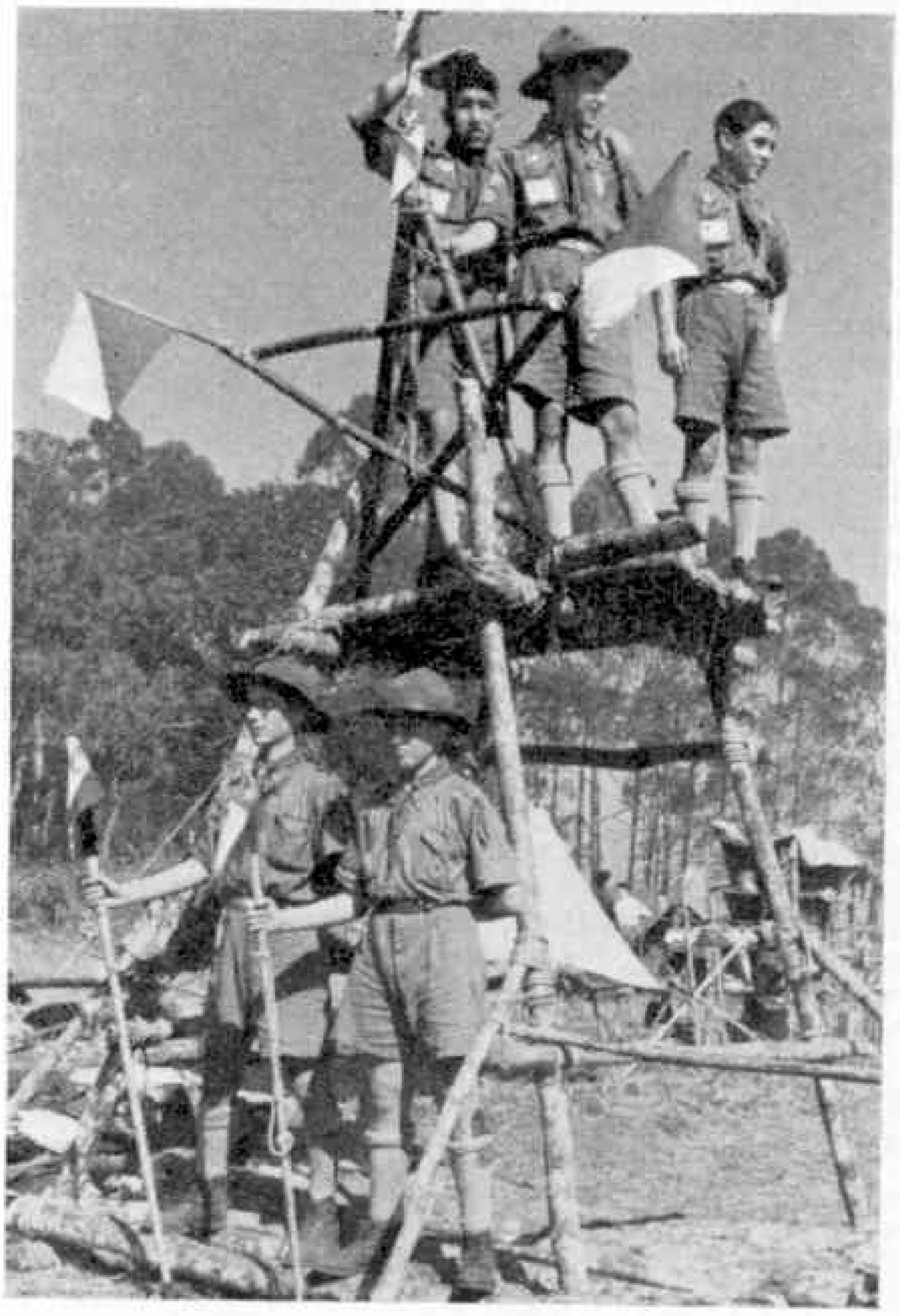
A tent platform in a tree. Dutch scouts are camping aloft.

cross roaring torrents at a great height. It takes a steady head to use them with any confidence.

Another kind of structure is shown in the second picture—a platform up in the trees, on which in this case a tent has been pitched. The strength of it can be judged by the number of boys on it. They are the Dutch Scouts who built it. You will also notice the rope ladder; here again the rungs are fastened with square lashings. In building such a structure use can be made of the nearby trees to give extra rigidity for security. It would certainly be unpleasant, to say the least, if the supporting platform and framework began to wobble while you were sleeping up there!

This emphasises an important point. Scouts do not make these structures just for fun; they get plenty of that out of the job, but the test is always whether they will stand up to real use.

Building towers is another form of timber work. The one shown in the lower illustration on this page was made by Scouts of Chile. It is not as high as such towers often are.



The tower stands *on* the ground; it is not dug in. The tapering gives strength, as it allows for the natural thrust as the weight is increased by spectators on the top platform. Great care has to be taken in making sure that the tower is upright, and that the inclination of the main poles is at the right angle. If they are too near upright, the tendency is for the structure to sway, and that very quickly loosens the lashings, however well they have been made. The taller the tower, the wider the square at the base must be and the stouter the timber.

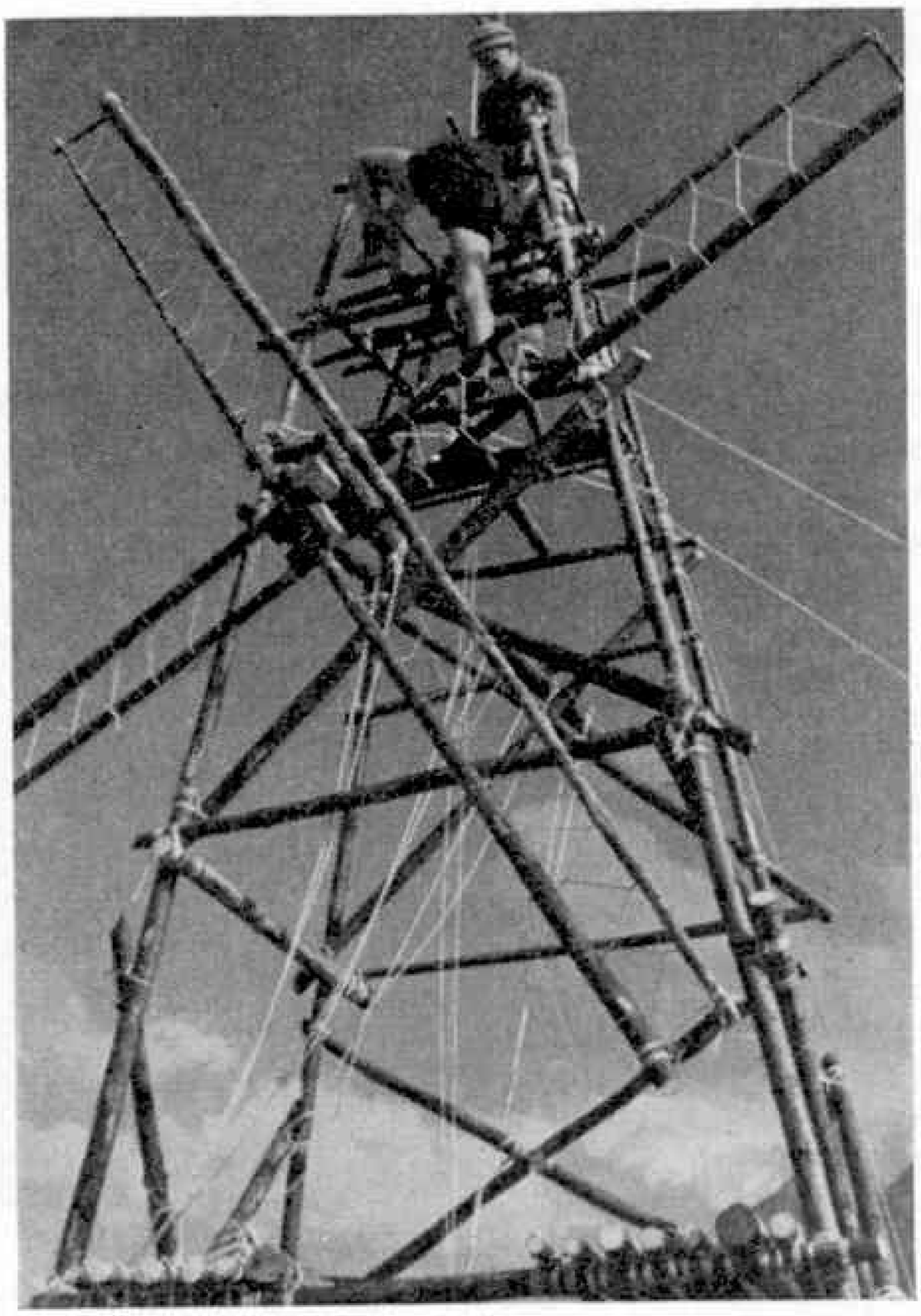
The selection of the poles is an important matter. You will notice that in all these structures the timber is untrimmed and still has its bark on, just as it came out of the forest. Most of it is probably still green. It does not follow that because the poles have come straight from the forest that they are sound. Each must be examined to make sure that it is without weak places caused by rot, or eaten into by ants or other creatures.

The fourth of our pictures shows the upper part of a very elaborate bit of constructive work. This was built by Sussex Scouts at the World Jamboree in Austria in 1951. They put it up as a kind

Chilean scouts on a timber tower they have built.

of symbol of the county from which they came. It represents a windmill. As this was considerably higher than the tower built by the Scouts of Chile, it had to have a much wider base and rather stouter timber had to be used.

You will notice the X-shaped braces holding the main spars apart and rigid. Notice also that the lashings do not depend for their strength on using a lot of rope or sisal. A small number of turns, if properly made, are all that is necessary for the purpose. The top platform here has a rail round it, and there is a lower platform at the bottom about ten feet off the ground.



A windmill with sails that revolve, built by British scouts.

Relatively little timber has been used. In structures of this kind the temptation is to use a lot of poles and rope with the idea that this increases strength. Actually it does not, for the more timber you use, the greater the weight and consequently the greater the stress. These Sussex Scouts wisely used the minimum of materials, making sure that all was sound, but carefully designed to take the strain in the right places.

The sails of the windmill were made to revolve by a clever arrangement of ropes. The network of sisal was decorative and not part of the structure.

From these examples of structure of timber and rope you will see that a number of engineering principles have to be taken into account; the problem of stresses and strains is always there, and unless it is carefully thought out, the simplest structure may come toppling down when it is put to the test of actual use.

Secrets of Rocket Power—(*Continued from page 352*)

But the story does not end there. Much effort is now being put forward in the rocket industry for the development of the multi-step rocket. The idea is to carry one rocket within another and, when the first rocket reaches its maximum speed, to fire the second rocket. This adds its own maximum velocity to that of the mother rocket and reaches a very high final speed. Several such stages can be used to fling missiles over transcontinental ranges, or for the setting up of an instrumented earth-satellite vehicle.

Development difficulties have been encountered in the separation of the steps, ensuring that the next stage fires immediately the motors of the previous stage have finished firing. The Bumper programme of the General Electric Company has overcome these obstacles and perfected a technique that has given Man his greatest altitude—242 miles. The results have been handed over to the group of rocket experts working under von Braun at Redstone Arsenal on the Redstone trans-continental multi-stage rocket missile.

When the security veil is finally lifted on some of these modern rocket developments we shall see some surprising results. It is over five years since the Bumper-WAC established the 242 mile record, and rocketry has by no means been standing still since that date. Proving stands are testing motors having thrusts greater than that of the V-2 rocket. It may be that the next important item of news to be released within the forthcoming years will be that a satellite vehicle has been shot into an orbit around the Earth. Indeed, there have been rumours that this has already been done.

Glorious Glosters—(*Continued from page 361*)

at South Kensington, London. It is one of the great aeroplanes of history, and so is the Gloster Meteor, which followed it.

Only Allied jet fighter used in action in World War II, the Meteor is still in world-wide use by the R.A.F. and many other air forces. It has been built in 34 versions, with 17 different types of engine; has broken the world speed record twice, with speeds of 606 and 616 m.p.h., and even shot down three Mig-15s in the hands of Australian pilots in Korea.

Its place on the production line has now been taken by the huge Javelin two-seat, supersonic, delta-wing, all-weather fighter, which will enter service with Fighter Command this year. But even that is not the end of the story, for a new fighter is being developed from the Javelin that will fly faster than sound in level flight.

So, in 40 years, aircraft built by Gloster's have progressed from 100 h.p. and a speed of 66 m.p.h., to the equivalent of 30,000 h.p. and speeds of over 700 m.p.h. Piston engines have given way to jets, open cockpits to pressure-cabins, machine-guns to guided missiles, wood-and-fabric biplane wings to smooth metal delta-wings. Who can guess what equally great changes the next 40 years may bring?

MECCANO MAGAZINE

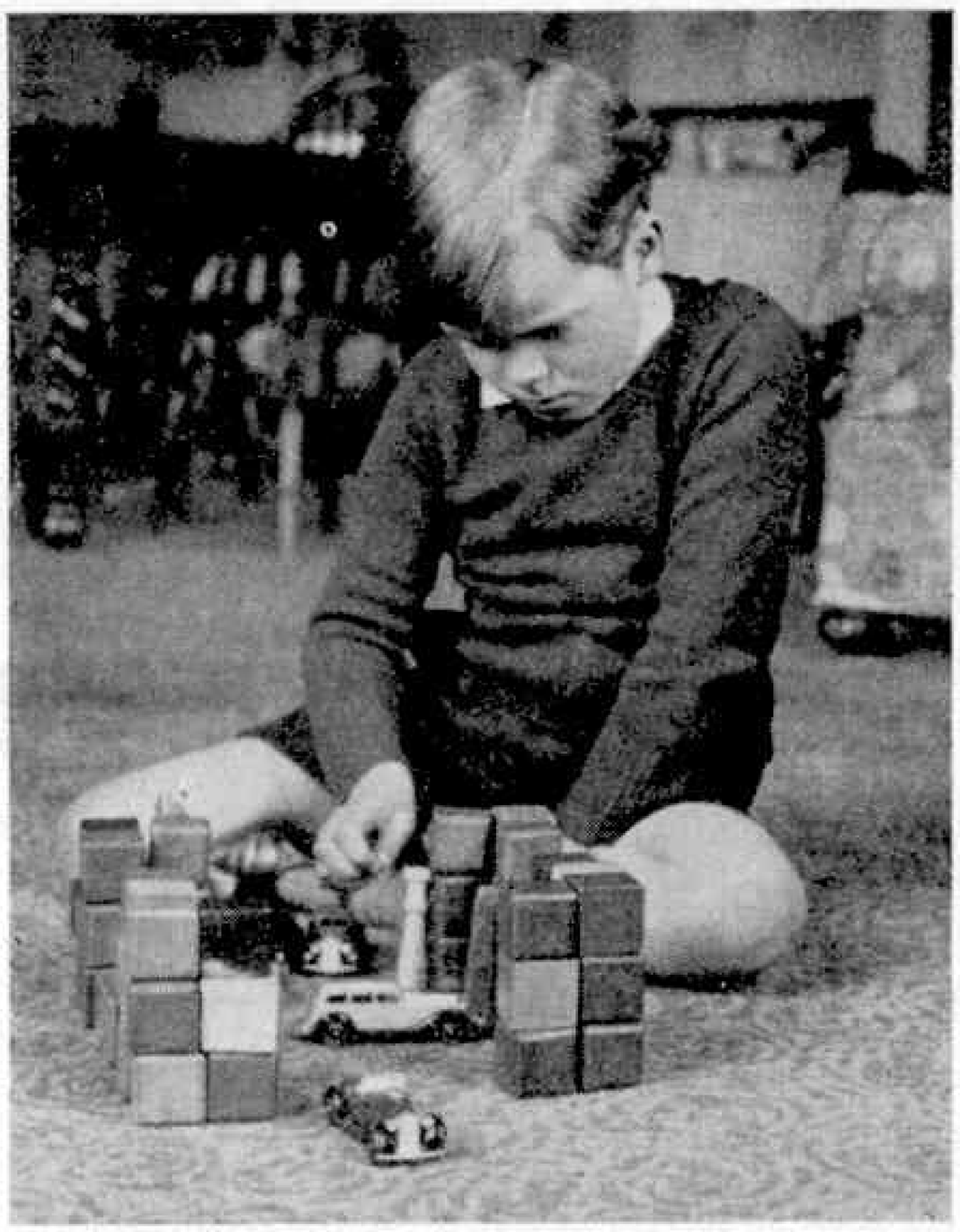
Junior Section

MECCANO has brought wonderful opportunities for the blind. It is used in training many of them for useful careers and has provided more with a splendid hobby. The lower illustration on this page provides an excellent example. The model shown is a working model of a Beam Pump, with the builder himself, Harry Williams, who has been blind from birth and is a capstan lathe operator in a Liverpool works.

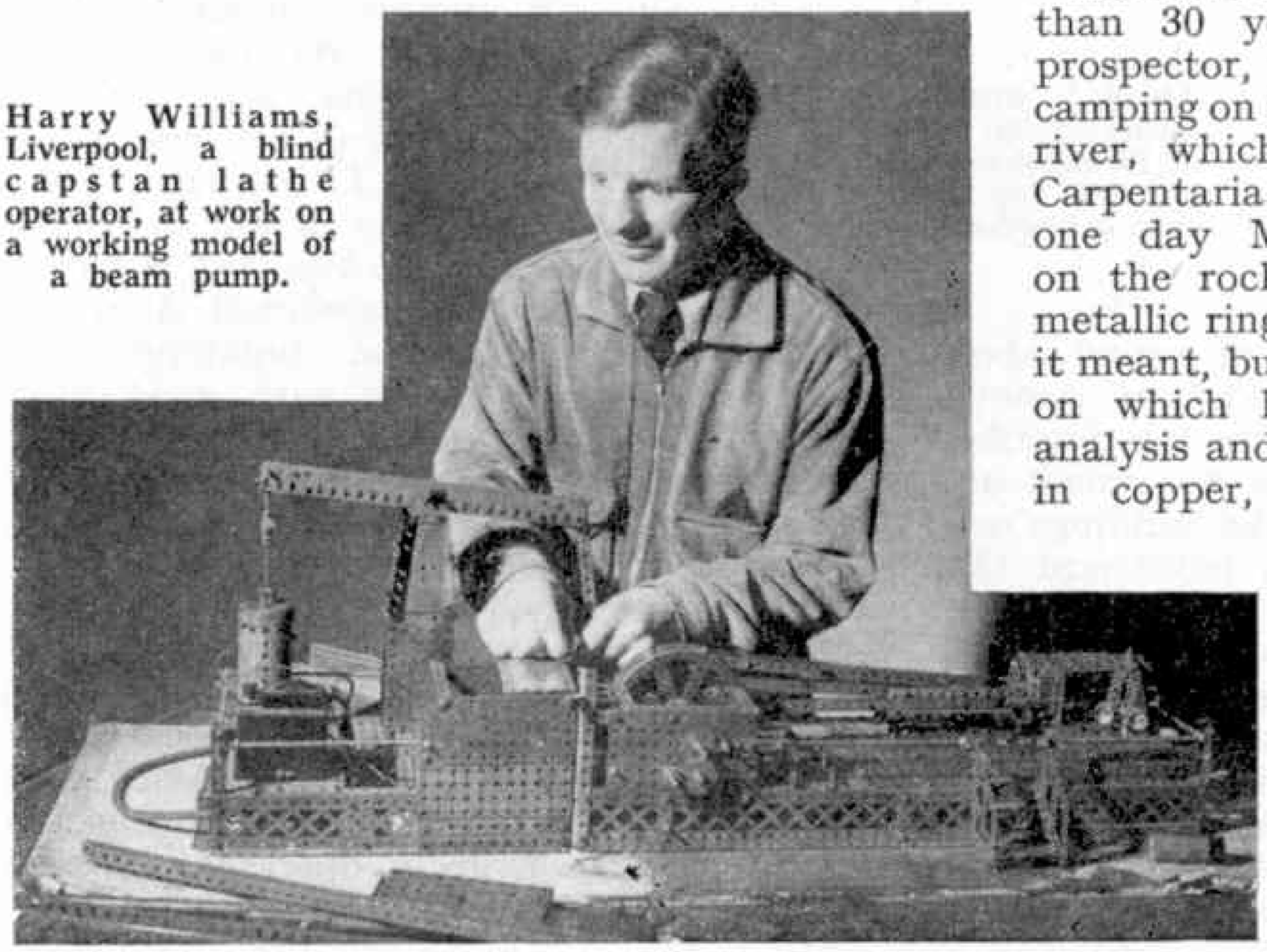
Prospecting Up-to-date

Not so long ago many of us thought that the days of prospecting for gold and silver were past. Now we find there are still exciting prospects of sudden wealth from minerals, but today the hunt is for uranium. Prospectors now go out armed with Geiger counters, which click when brought near a radio-active mineral.

Just over a year ago three miners did this and found uranium ore in rough rocky country about 23 miles away from the copper and zinc mines at Mt. Isa, in Northern Queensland. This started a stampede. Almost everyone in Mt. Isa set out over the countryside hoping to find uranium. Claims were pegged out, some of which proved to be real strikes, and there is every prospect of the creation in Queensland of a large uranium mining industry.

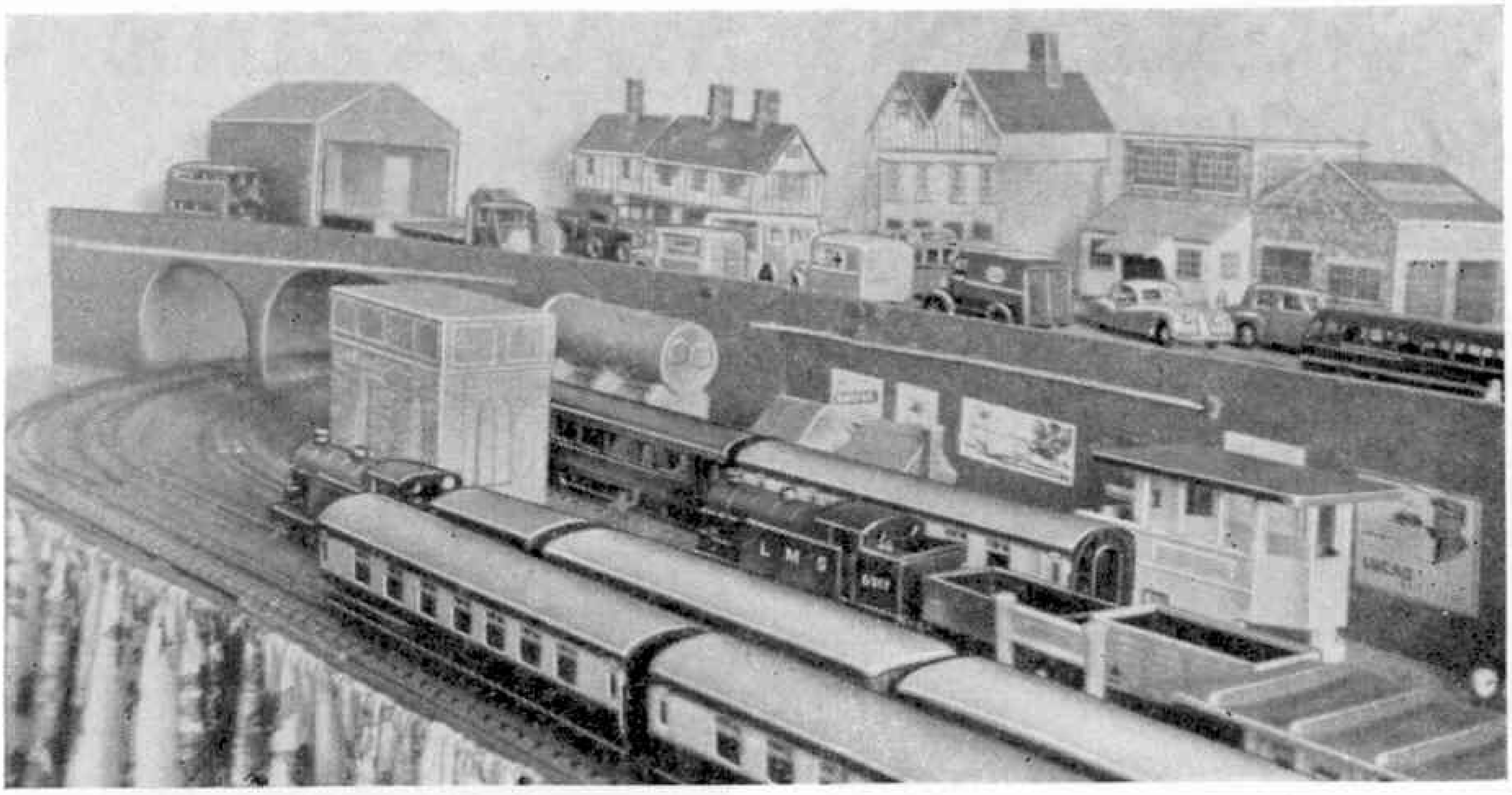


A knotty Dinky Toys garage problem. This Dinky Toys enthusiast is the son of W. G. Macgregor, Hove, who sent this picture.



Harry Williams, Liverpool, a blind capstan lathe operator, at work on a working model of a beam pump.

Romance came to Mt. Isa more than 30 years ago, when an old prospector, John Campbell Miles, was camping on the bank of the Leichhardt river, which flows into the Gulf of Carpentaria. When cooking his dinner one day Miles dropped his knife on the rock and heard an unusual metallic ring. He did not know what it meant, but sent samples of the rock on which his knife had fallen for analysis and found that this was rich in copper, lead and zinc. From this almost accidental event there developed the great copper and lead mines of Mt. Isa, where there are believed to be about 4 million tons of copper ore and nearly 10 million tons of lead ore still waiting to be extracted.



Hornby-Dublo, Indoors and Out

By "Tommy Dodd"

THIS month I am having a change. Since we began our talks some months ago I have been dealing only with Hornby Gauge 0 affairs. Now I am turning to Hornby-Dublo, not as a regular thing, but I hope that in future issues I may be able to deal sometimes with Dublo and sometimes with Gauge 0. A lot will depend on the letters that you send to me telling me about your railways and asking questions on any little problems you may have.

A great point about a Hornby-Dublo railway is the small amount of space needed for a reasonable layout. A very useful system giving lots of fun can be laid down in a small space, and many of you no doubt have layouts fitted on to baseboards of round about 6 ft. × 4 ft. Even when a railway is not a permanent feature, like the one described on page 390, this month, the track and possibly some at least of the buildings may well be fixed down on a baseboard that has to be stored when not in use. In this way it is possible for the Hornby-Dublo owner to use his railway almost anywhere, given sufficient space, and in addition he can have it ready for running in the shortest possible time. This type of layout can be classed as semi-portable.

Apart from anything else a board has the special advantage at this time of the year that it can be taken out of doors, weather permitting, and many of my Hornby-Dublo friends seem to like this idea. A permanent garden layout is something rather beyond the possibilities of 00 Gauge, but a layout that can be taken into the garden can provide plenty of enjoyable railwaying, along with fresh air and sunshine for the owner.

Details of a layout that is really portable have reached me from New Zealand, where Mr. L. J. Carian, of Palmerston North, has assembled the neat and tidy system shown in the upper picture on the following page for the benefit of his sons, Errol and Terence. This railway is still in course of development, so as yet the baseboard does not carry many additional buildings and accessories. It is made with good deep supporting timbers, something like a big tray upside down, so that there is plenty of room underneath for wiring and for the dry batteries used for lighting purposes.

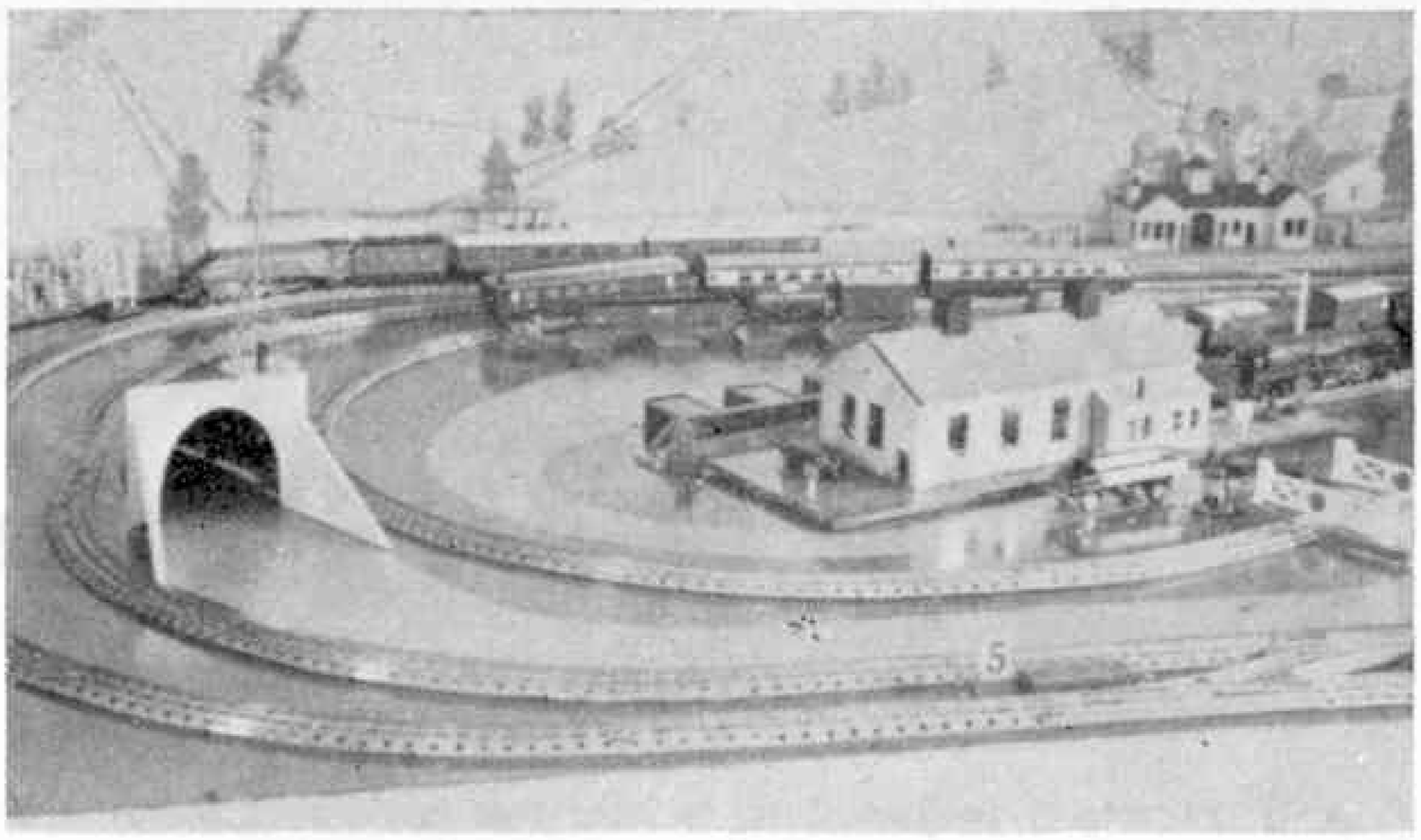
Above is part of the Hornby-Dublo layout of Mr. K. J. Lee and his son, of Birmingham, that was described in the M.M. last February. The miniature town is situated above the railway track.

Not only is the railway portable, but the control arrangements are too. They themselves are mounted on a separate board and can be situated some distance away from the actual railway if necessary. All the accessories on the track, including the Points, are electrically operated. Special attention has been given to the various

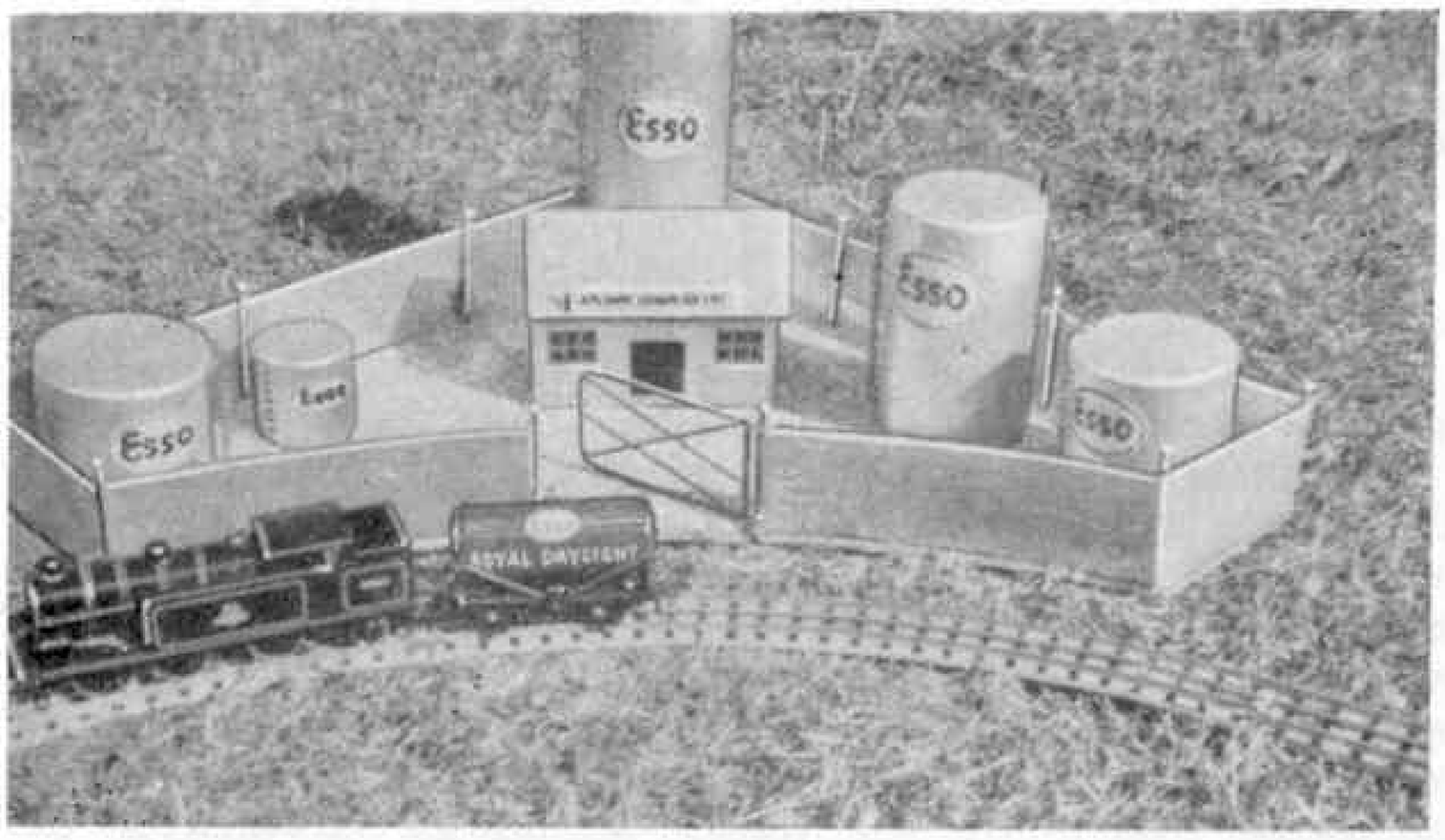
buildings that decorate the lineside. Although these are few in number they make up for this by their splendid construction and their attractive nature.

You will notice in the picture what seems at first sight to be a tunnel that looks as though it had been placed wrongly from the railway point of view. Actually this is a wide overbridge that is carried over the highway that runs between the innermost and the central track of the three running lines shown in the picture.

Those of you who like ideas for lineside installations will be attracted by the lower illustration showing a petrol storage depot. The storage tanks and the buildings together form a self-contained unit, all within the walls of the little compound with its modern tubular gate that can easily be put in position indoors or out. It is seen in just the sort of place to be served by the Hornby-Dublo



The illustration above shows part of the Hornby-Dublo system that was developed by Mr. L. J. Carian, New Zealand, for his boys, Errol and Terence. The outdoor view below shows an attractive petrol storage installation that is part of the railway.



Petrol or Oil Tank Wagons, and I expect that some of you at least will begin to do something similar straight away. The wording on the storage tanks is easily arranged by looking out for suitable advertisements, cutting out the wording required and gluing the "labels" on to the tanks themselves.

You will notice how the depot is shaped to follow the curve of the railway. This has been done specially because the whole accessory is intended to fill one of the corners outside the track that are inevitable on a rectangular board. There is another accessory similar in plan. This represents a very typical New Zealand sheep pen and loading ramp. The ramp is arranged to lead up from the floor of the pen to the correct level for the sheep to enter a standard Cattle Truck. The pen looks very effective indeed. The miniature sheep had to be carved at home from solid wood because no suitable manufactured figures were available.

A special feature has been made of the lighting of the system, torch bulbs being wired to suitable batteries in the "basement" on the railway. One safety-first measure has been the installation of red warning lights at the level crossing. When the gates are closed for road traffic the bulbs are lit automatically on the approach of a train. Contacts beneath the track are responsible for this, and the same scheme is used elsewhere on the system. The weight of the train depressing the track completes the circuit.

The background belonging to the railway board is detachable and has been painted up with what are known as showcard paints. When the board is out of use it stands on end against the sitting room wall.

DINKY NEWS

Petrol Pumps for Your Layouts

By **THE TOYMAN**

LAST month I included in my article a brief description of a fuel storage tank designed for use in a Dinky Toys bus garage, and you may remember I mentioned that some collectors seem to overlook the necessity for providing some means of fuelling their buses and coaches at their depots. This is certainly not the case with other vehicles in the Dinky Toys range, for many boys have written to me suggesting that miniature petrol pumps should be introduced as soon as possible. These enthusiasts quite rightly point out that cars and lorries are of little use to Dinky Toys communities unless adequate supplies of petrol are available to keep them on the road, and service at the garages in their layouts was likely to be very slow indeed without modern pumps to deliver fuel quickly and efficiently.

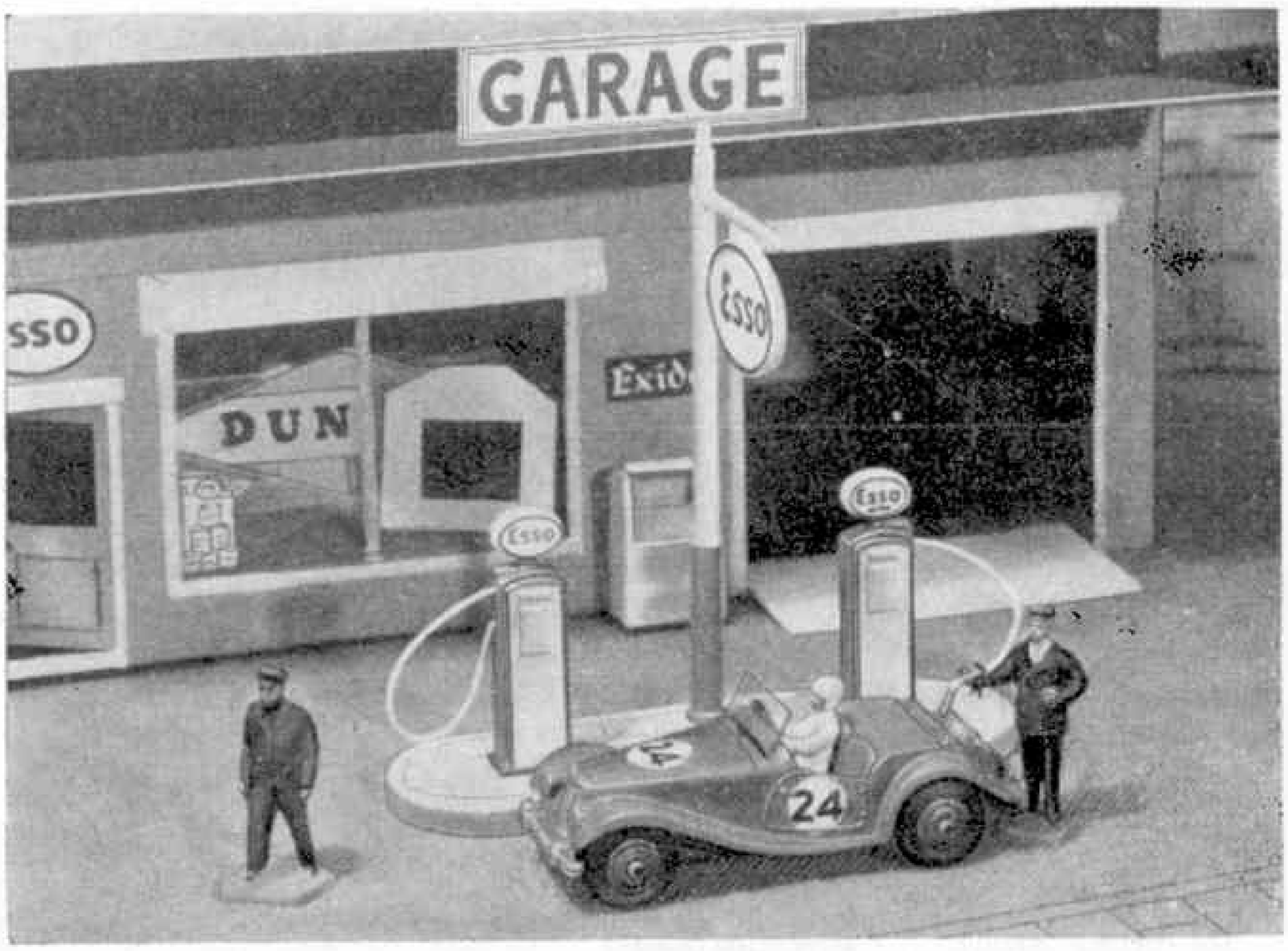
Some of my correspondents remembered the Dinky Toys Petrol Pumps available before the war, while others had seen examples of these Pumps at the homes of their friends, and they suggested that the pre-war set should be reintroduced. However, as the Pumps in that set are now rather out of date we were unable to adopt the idea and instead it was decided to produce a completely new set designed on modern lines. The result is the new 'Esso' Petrol Pump Station, Dinky Toys No. 781, which is shown in two of my pictures this month. This is just the thing to add a final touch of realism to your layout.

A busy garage on a Dinky Toytown layout, in which good use is made of the new 'Esso' Petrol Pump Station, Dinky Toys No. 781.

The new model is right up to date in design, and consists of two realistic pumps mounted on an island base marked to indicate paving stones. In the centre of the island a slender upright column carries the well-known 'Esso' sign with its characteristic style of lettering. Each pump is fitted with a length of hose ending in a reproduction of the delivery nozzle, and when not in use this nozzle fits neatly into a slot in the side of the pump, like the real thing.

The pumps are brightly enamelled in white and red, and the usual 'Esso' transfers are applied to the imitation globes on top. The column also is painted red and white, and the island base is appropriately finished in a realistic stone colour. By the way, the pumps and the column are detachable from the base, so that they can be removed for safety when the set is stored away.

One of my pictures is a close-up shot of an M.G. Midget Sports Car being refuelled by the pump attendant. Evidently the driver is on his way to take part in a motoring event of some kind, as his car already bears competition numbers. This picture displays in full measure the realistic appearance of the new model, and shows how easily the delivery pipe can be moved to bring the nozzle into line with the filler pipe of the car. Incidentally, the ticket collector from the Dinky Toys Station Staff Set (Gauge 0) makes an excellent



The realistic details of the 'Esso' Petrol Pump Station greatly increase the effectiveness of any garage layout.

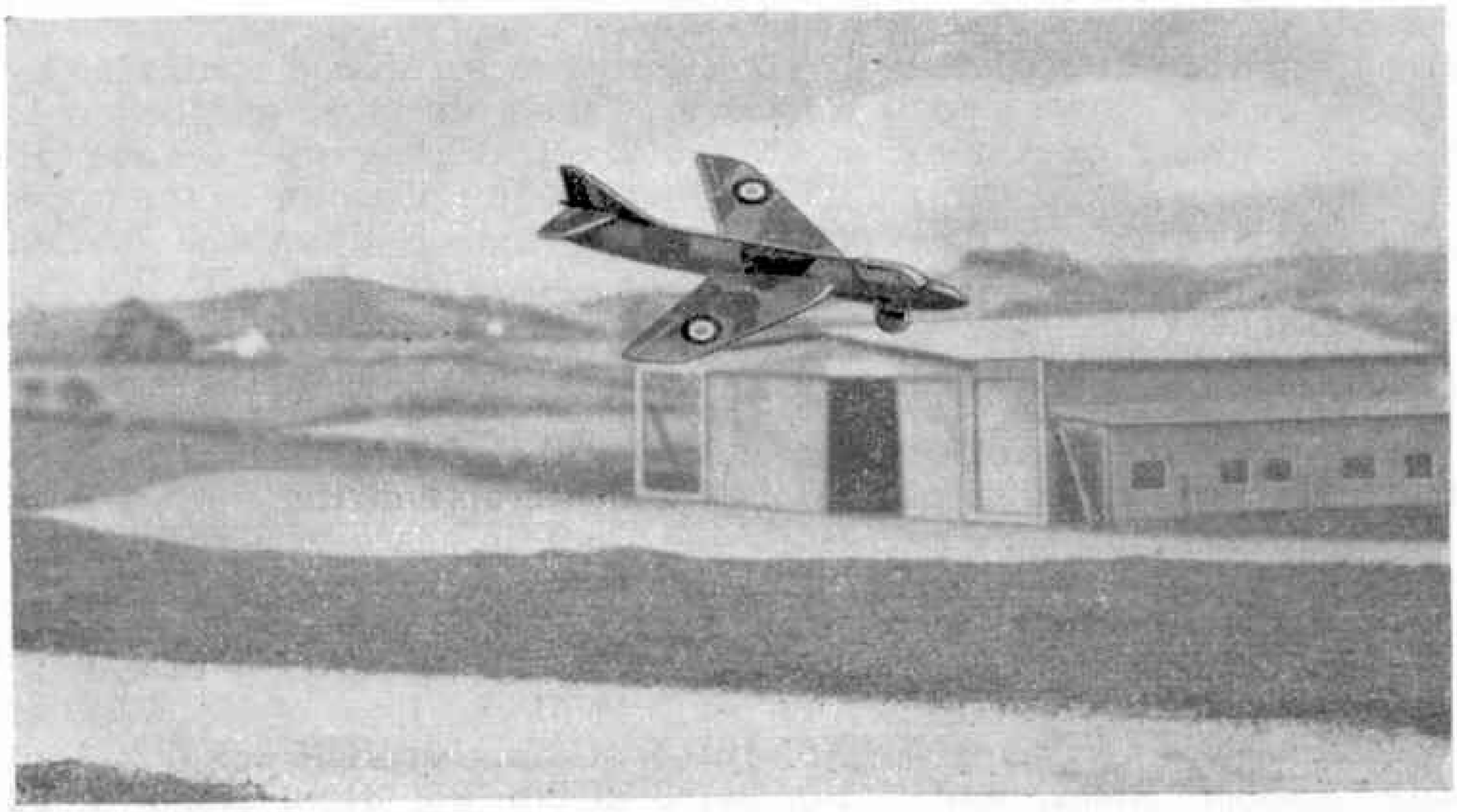
garage attendant. The hose can be attached to his outstretched arm by a piece of fine thread or a small rubber band.

Now for some news that will be welcomed by my many correspondents who have suggested additions to the range of Dinky Toys aeroplanes. Last October we announced the introduction of the Dinky Toys De Havilland Comet Air Liner, and the enthusiastic reception given to this model showed how keen collectors were to add to their air fleets. It is some time since a new Royal Air Force machine was added to the range, but now we have introduced a model of one of the most famous jet aeroplanes in service, the Hawker Hunter day fighter. This machine is in large scale production for the Royal Air Force and for certain Continental and Scandinavian countries, and some time ago a Hunter made headline news when it recaptured temporarily for Britain the world's air speed record at 727.6 m.p.h.

The new model, Dinky Toys No. 736, is based on the Hawker Hunter F.1, powered by a Rolls Royce 'Avon' turbo-jet. This is a single-seat, swept back mid-wing monoplane, with extremely clean aerodynamic lines that result in excellent all-round performance. It is highly manœuvrable at great altitudes, and the pilot is provided with a fully pressurized air-conditioned cockpit. The Dinky Toys model is beautifully made and finished, and captures in full measure the vivid impression of speed and power given by the striking lines of the actual Hunter.

The Dinky Toy is finished in camouflage colours with R.A.F. roundels, and the tricycle undercarriage is represented in position for take-off or landing.

In the lower picture on this page you can see a Hunter coming in to land at a Dinky Toys airfield.

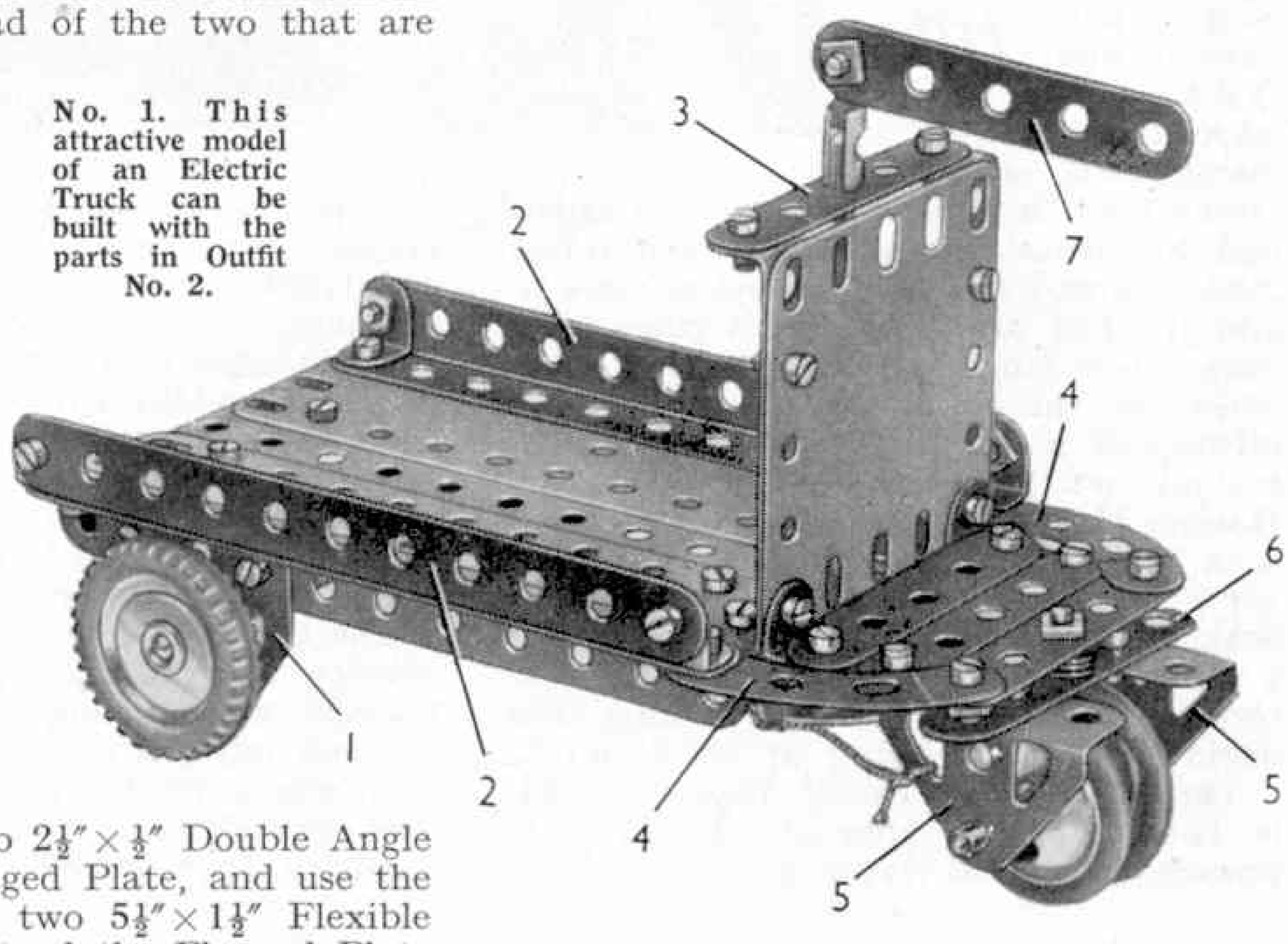


The new Dinky Toys Hawker Hunter, preparing to land on a model airport layout.

Easy Model-Building

Spanner's Special Section for Juniors

LAST month I described two models for Outfits Nos. 0 and 1 respectively, and now I have a very attractive model of a slightly larger type specially designed for owners of Outfit No. 2. This is the Electric Truck shown in pictures Nos. 1 and 2. For those readers who are interested in building model cranes, and I know that most Meccano boys are, I am describing a simple mechanism by means of which the load hoisting and the raising and lowering of the jib can be worked from one handle, instead of the two that are normally required.



No. 1. This attractive model of an Electric Truck can be built with the parts in Outfit No. 2.

To start with the Electric Truck its main frame or chassis is made by taking a $5\frac{1}{2}''$ × $2\frac{1}{2}''$ Flanged Plate and bolting a Flat Trunnion 1 to each of its longer sides. Now pass a $3\frac{1}{2}''$ Rod through the Flat Trunnions and fix two 1" Pulleys fitted with Tyres on the Rod. Bolt two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips to the Flanged Plate, and use the same bolts to fix two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates so as to extend the Flanged Plate on each side. Strengthen the outer edges of the Flexible Plates by $5\frac{1}{2}''$ Strips and then attach further $5\frac{1}{2}''$ Strips 2 to Angle Brackets on each side.

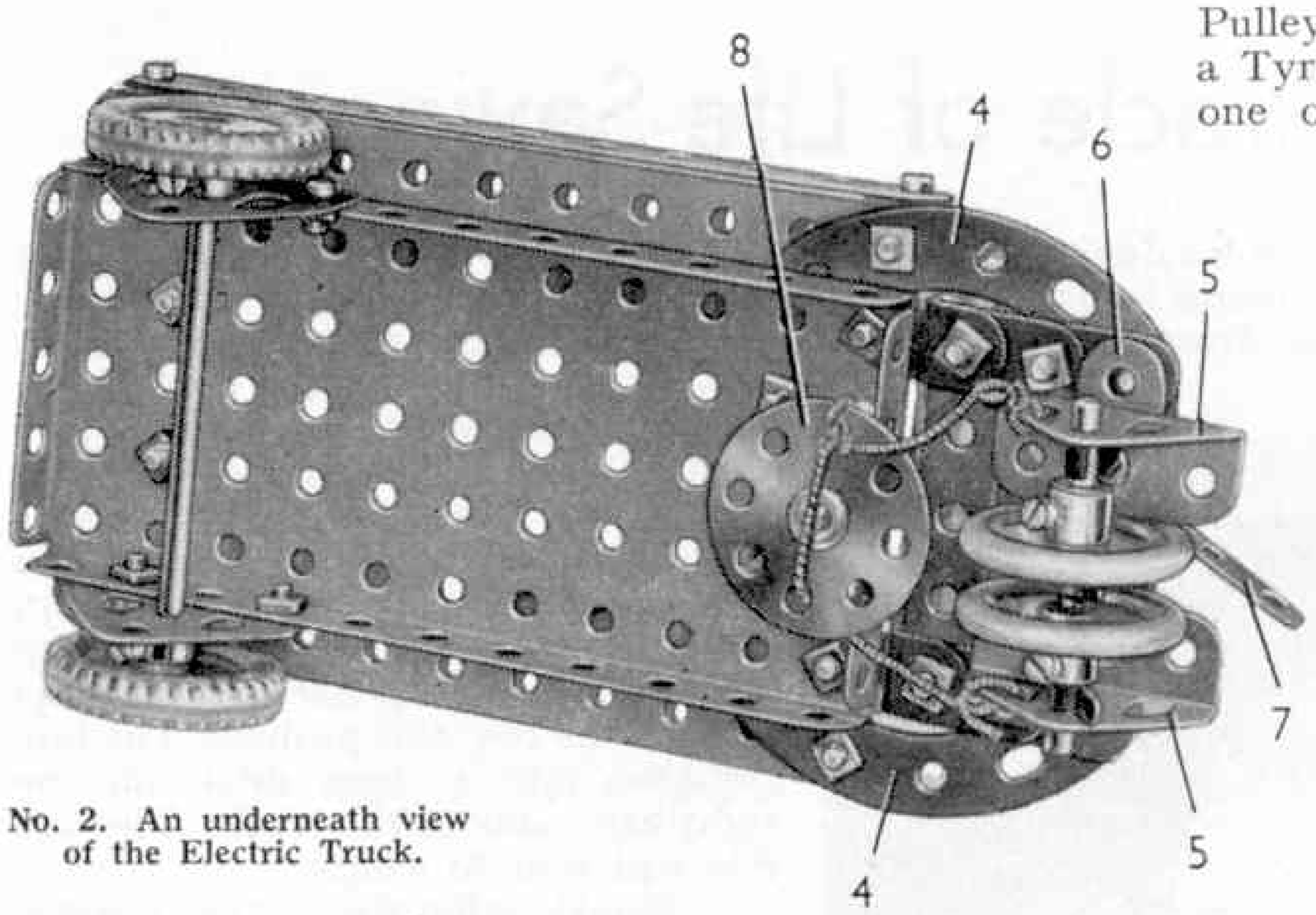
Fix a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate to the $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips, and bolt a $2\frac{1}{2}''$ Strip 3 to their top lugs.

To make the driver's platform, connect together three $2\frac{1}{2}''$ Strips by means of four Fishplates, and attach it to Angle Brackets fixed to the lower ends of the $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips. Now bolt a $2\frac{1}{2}''$ Stepped Curved Strip 4 on each side between the driver's platform and the front corner of one of the $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates.

For the steerable wheels use two 1" Pulleys fitted with Rubber Rings, and retain them on a 2" Rod by Spring Clips. Support this Rod in two Trunnions 5, bolted tightly to a $2\frac{1}{2}''$ Strip 6. Pass a $\frac{3}{8}''$ Bolt through the centre hole of the Strip 6 and place three Washers on it. Next screw a nut on the Bolt, but do not tighten it. Now pass the Bolt through the driver's platform and then screw a second nut tightly in place. Make sure that the Strip 6 is able to turn freely on the Bolt.

The steering mechanism is controlled by a lever 7. Take a $2\frac{1}{2}''$ Strip and bolt it to a Rod and Strip Connector. Then fix the Rod and Strip Connector to the upper end of a $3\frac{1}{2}''$ Rod. Support the Rod in the Strip 3 and in the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, and at its lower end fix a Bush Wheel 8. Tie a length of Cord to one of the Trunnions 5, pass it through one of the holes in the Bush Wheel and then through another hole in the Bush Wheel. Knot the Cord in place and then tie it finally to the second Trunnion 5.

To build the Electric Truck you will require the following parts: 4 of No. 2; 6 of No. 5; 4 of No. 10; 6 of No. 12; 2 of No. 16; 1 of No. 17; 4 of No. 22; 1 of No. 24; 3 of No. 35; 34 of No. 37a; 32



No. 2. An underneath view of the Electric Truck.

of No. 37b; 3 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 1 of No. 111c; 2 of No. 126; 2 of No. 126a; 2 of No. 142c; 2 of No. 155; 2 of No. 189; 1 of No. 190; 1 of No. 212.

A Useful Mechanism for a Crane

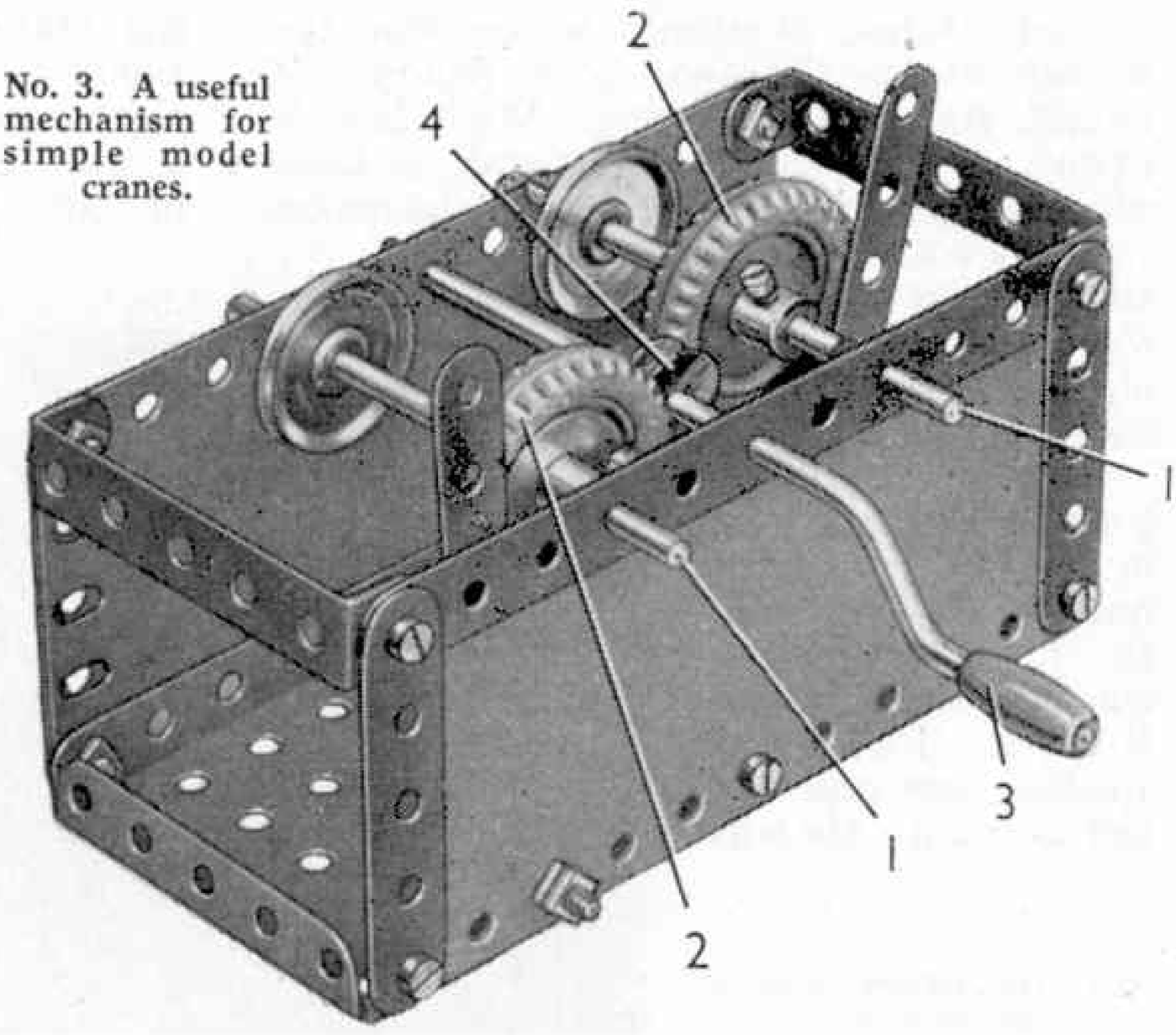
In most small model cranes two hand-operated movements are required, one to raise or lower the jib and the other to lift or lower the hook and its load. Generally a separate winding handle is provided for each movement, and of course this works quite satisfactorily. It is however, a good plan to simplify the control arrangements as much as possible, and in a crane the two movements I have mentioned can be operated by a single winding handle.

The arrangement is shown in picture No. 3. You will notice that the mechanism is supported in a frame made from $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates bolted to a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, and strengthened by Strips and Double Angle Strips. This frame is intended to represent the lower part of the cab of a crane, but of course the design of the frame can be altered to suit any particular model you wish to build and the parts you have available.

Each of the winding shafts 1 is a $3\frac{1}{2}''$ Rod mounted in the frame as shown, and each shaft is fitted with two $1''$ Pulleys, one of which carries a Tyre 2. The two Pulleys of one of the Rods are placed against the sides of the frame to prevent the Rod from sliding endways. One of the Pulleys on the other Rod is placed against the side of the frame also, but the second Pulley on this Rod is spaced about $\frac{1}{2}''$ away from the side. A Spring Clip is placed on this Rod to prevent it from sliding.

A Crank Handle is supported in the frame, between the Rods 1, and on it is fixed a $\frac{1}{2}''$ Pulley 4. The Crank Handle is able to slide endways slightly, until the Pulley 4 is pressed against one or other of the Tyres 2. Thus if you push the Crank Handle to the left the $\frac{1}{2}''$ Pulley presses against one Tyre, and when the Crank Handle is slid to the right its $\frac{1}{2}''$ Pulley presses against the other Tyre. When the Pulley is in contact with either one of the Tyres the drive is sent to the winding shaft on which that Tyre is fixed. A brake to prevent each shaft from turning except when required is made in the way I described in the May *M.M.* You will remember that this brake is simply a Strip lock-nutted to the frame so that it can be moved against the Tyre on the winding shaft.

No. 3. A useful mechanism for simple model cranes.



A Miracle of Life-Saving

THIS picture of a boy with his dog is full of interest. The boy is Dennis Lobaugh, who lives on a farm in Iowa, in the United States, alongside which run the *Rockets* of the Chicago, Rock Island and Pacific Railroad Company. With him is Penny, a companion who seems to have constituted herself his protector. She makes sure that farm animals do not get too near him by nipping at them when they approach!

Dennis Lobaugh with Penny, who saved him from being killed by a train when he strayed on the Rock Island line. Photograph by courtesy of "The Rocket," the magazine of the Rock Island Lines, U.S.A.

But Penny has done something much more remarkable than that, as J. R. Windsor, who drives one of the Rock Island *Rockets*, saw one day last autumn. He was travelling alongside the Lobaugh farm at about 70 m.p.h. when he saw a large dog standing between the rails ahead and a small boy very close to one of the rails, but just outside.

"We blasted our whistle," he said afterwards. "We could see the dog look up at the approaching train, then back at the boy. When we were within 50 ft. the big collie reared up on its hind legs, pressed its forelegs against the boy and pushed. The boy tumbled into a deep ditch on the right hand side of the track. The dog followed him to safety."

A month later the engineer made a special 45 mile trip to see the boy and his mother, who until then knew nothing of what had happened. But she had noticed that Dennis, who is only two years old, had since kept away from the track.

Here too is a railway curiosity. The second picture on this page, sent to me by a Belfast reader, shows a station with a very surprising name. It is in Eire, on the line from Thurles to Clonmel. The nameboard on the platform says *Horse & Jockey*, and apparently it is by this name that the place is known, although it is said that its original name was Parkstown. There is a Horse & Jockey Inn close by, and possibly the station acquired the name from it. Usually the association between a railway and an inn sign starts the other way. This is shown by the many *Railway Inns* seen in various parts of the British Isles.

An Irish station with a quaint name.

BOOKS TO READ

Here we review books of interest and of use to readers of the M.M. With certain exceptions, which will be indicated, these should be ordered through a bookseller.

"OXFORD JUNIOR ENCYCLOPÆDIA"
VOLUME VIII: ENGINEERING
(Oxford Universities Press 30/–)

An encyclopædia, even a junior one, suggests something large and comprehensive. There is certainly a lot in this volume of the Oxford Junior Encyclopædia, which is exact and informative without going too far into detail. The cost of the volume is rather high, but it has nearly 500 large pages and will provide a boy intending to become an engineer with a store of interesting and helpful reading.

Let us look at some of the subjects that are dealt with in the articles in this volume. Power of course is the first requirement of the engineer, and in fact power is civilisation. Here the reader can learn about the way in which wind and water power have been turned to good use throughout the ages, and how various fuels have been used as sources of power in steam engines and the internal combustion engine. The electric motor also is dealt with, and there is too a short but interesting account of the development of nuclear power.

Man depends enormously on the design and use of tools, and machine tools of all kinds are described in the various sections on mechanical engineering. The metals and alloys with which the mechanical engineer works and their behaviour are explained, with an interesting section on heat treatment, with which the engineer can make his materials harder or softer, more springlike or more plastic, or give them other properties that may be desired.

The work of the civil engineer is apparent to all who move about the country and see the roads, railways, bridges and docks and harbours. This important branch too is excellently dealt with in a series of articles, all readily found because of the alphabetical arrangement of the Encyclopædia. The present age is one of electricity, and naturally electrical engineering provides the material for a large proportion of articles in this volume. This not only deals with the generation of power and its distribution, and with its use for heating, lighting and the driving of electric motors; it includes also contributions on radio, radar and television.

Finally there are special articles dealing with a vast range of activities in which the engineer and engineering methods are concerned. Shipbuilding, the making of aircraft, the production of cameras, telescopes, microscopes, refrigerators and other instruments of various kinds too are dealt with. All these topics are dealt with attractively, with a wealth of diagrams that help to explain general principles and a very large number of excellent illustrations, some in colour.

"BUILDING BRITAIN'S BUSES"
By T. Dawson and F. G. Clark
(Ian Allan 5/–)

It is not possible for you to pay a visit to the factories of Leyland Motors Ltd., but this book enables you to do the next best thing, that is to read the story of an imaginary tour of Britain's largest bus and truck factory. In the course of 12 chapters three boy visitors, John, Brian and Timothy, are taken by their guide, a Leyland apprentice, through the different sections of the works. They are somewhat astonished to find that there is so much involved in the designing, building and testing of road vehicles, both passenger and goods.

Naturally the tour starts in the Drawing Office, where much hard and intricate work has to be put in before even the smallest component of a vehicle can take shape. The mysteries of moulding and casting are probed in the foundry, then comes engine production and assembly and the manufacture of the other main units. At the same time the importance of the planning and control departments is not overlooked. Then comes the fitting together of the various components that together make up the chassis of a road vehicle.

Body building and finishing, both somewhat specialised activities, have a chapter to themselves and the importance of the inspection and research departments is emphasised. Finally the party of visitors, and of course the reader, is convinced that nothing is left undone, from preliminary design through to road test, to ensure the production of a sound and reliable vehicle that will knock up a very respectable mileage in passenger or goods transport.

"MERCHANT SHIPS: WORLD BUILT"
(Adlard Coles 25/–)

Last year U.K. shipyards maintained their lead, with the launching of new tonnage totalling 981,355 tons out of a world total of 5,252,631 tons gross, in spite of increasing competition from shipbuilding firms abroad. Perhaps the most striking instance of this growing competition was the emergence under a different name of the famous Blohm and Voss shipyard, in West Germany, completely rebuilt and now ranking as one of the best-equipped and most competitive in the world. In addition to West Germany, new shipbuilding records were achieved in France, Norway and Sweden.

Previous editions of this valuable book have dealt only with the output of new ships of 300 tons and upwards from British shipyards. In this third volume the scope of the book has been extended to include all new ships of 1,000 tons gross and upward built in 1954 in all the major shipbuilding countries of the world. The basic features of the work have been maintained and enlarged, and details are given of about 630 new ships, compared with 193 in the previous volume. The number of illustrations is nearly doubled.

Merchant Ships is divided into 21 sections, of which 17 each deal with one particular country, giving shipbuilding statistics of the year, output of each individual shipyard, and illustrations of the chief new ships, with descriptions drawing attention to purpose and features of design. The book also contains an alphabetical register of new ships, and a list of shipowners of the world with the names of all new vessels launched for them in 1954.

There are nearly 200 photographs and designs, including 20 profile and general arrangement plans of passenger vessels, cargo liners, general traders, bulk carriers and miscellaneous ships.

"FAMOUS TRAINS"
No. 1 "The Elizabethan"
No. 2 "The Royal Scot"
No. 3 "Cornish Riviera Express"
No. 4 "Atlantic Coast Express"
(Ian Allan Ltd. 6d. each)

Here are four of a series of handy little booklets dealing with various famous trains. Each represents a very good sixpennyworth, consisting of nearly 30 pages dealing with the journey of the train concerned, the locomotives and rolling stock and items of railway and general interest on the way. To accompany the text almost every page carries a section of route map showing stations, junctions and so on.

If we are travelling on any of the trains concerned, the appropriate book makes a useful and informative companion. If we are not so lucky, well, they are interesting to read anyway. Considering the size adopted for the booklets the illustrations are good and most of them are pleasantly up-to-date.

Air News

By John W. R. Taylor

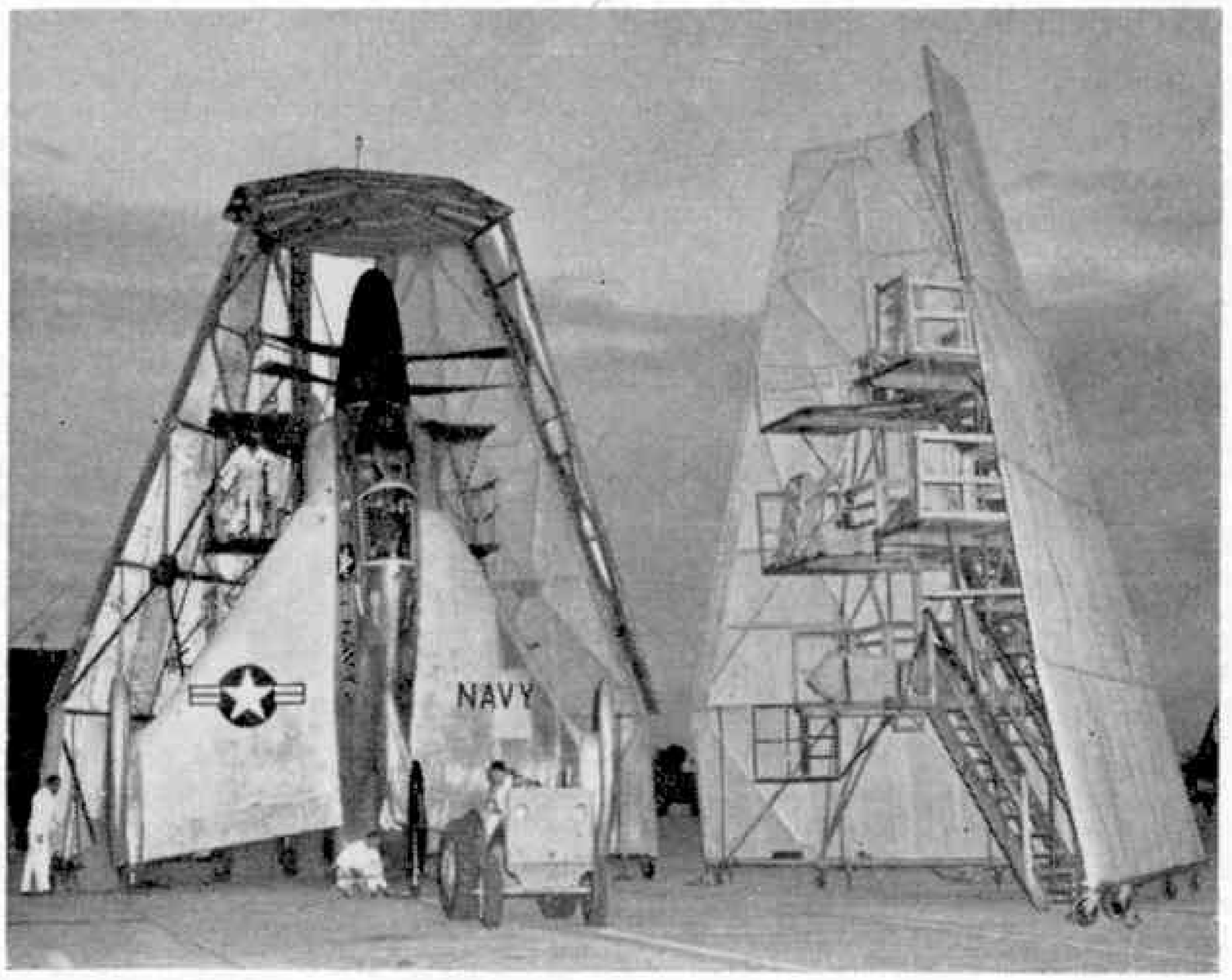
More North Pole Flights

Second airline to introduce "over the pole" flights between North America and Europe is Canadian Pacific. Following the pioneer lead of Scandinavian Airlines System, it made a proving flight on the route from Vancouver to Amsterdam in April with a DC-4, and began scheduled services last month, flying DC-6Bs.

World's Smallest Hangar

The Convair XFY-1, world's first vertical take-off fighter, is housed between flights in the world's smallest hangar. Built in three weeks by Convair personnel, the 36 ft.-high hangar has a wood and steel framework, covered with yellow fire-resistant fibreglass, and looks rather like an outsize pepper-pot. It has been made in two halves and mounted on wheels, so that it can be towed to the aircraft and wrapped around it in the normal nose-up parked position.

Tailor-made to conform to the XFY-1's contours, the lightweight hangar is not merely a protection against the weather. Platforms have been built inside it, connected by stairways, and it has its own interior lighting; so that ground crews can work on any part of the aircraft in comfort by day or night.



A tractor manoeuvres the Convair XFY-1 "Pogo" into position for housing in its unique hangar at Brown Field Naval Auxiliary Air Station near San Diego, California. The tepee-shaped hangar on wheels enfolds the aircraft like halves of a clamshell.

Geography from a New Angle

Children from 15 schools in the Birmingham area are again having airborne geography lessons this summer, under B.E.A.'s "flying classroom" scheme.

Last year the scheme enabled 1,125 schoolchildren, forming 75 parties, to fly from Birmingham to London Airport and back. During their flights, towns, railways, roads and prominent features of the landscape and cities formed the subject of lessons given by teachers who accompanied them. The Captains of the aircraft also gave talks to the children en route.

Colour Radar Being Tested

The types of radar in use today produce only colourless "blips" or dots of light to indicate objects in the area scanned by the sets. A new experimental U.S. radar set is able to produce two colours on the darkened face of the radar screen, so that aircraft can be followed as bright orange dots moving over pale green land areas.

Most obvious advantage of colour radar is its visual aid to civil air traffic controllers or military operations room personnel Standard sets, for example, produce the same kind of "blip" for aircraft at all altitudes. The colour set can be adjusted so that high-flying aircraft appear as orange "blips", while those at lower altitudes appear green. The operator can tell at a glance what air traffic is in the vicinity at both high and low altitudes. Furthermore, the scientists of Chromatic Television Laboratories, who developed the new radar, say that a third colour could be introduced without great difficulty.

U.S. Firm Builds 5,000th British Engine

The American Curtiss-Wright company have delivered to the U.S. Air Force and Navy more than 5,000 J65 Sapphire turbojets, which they are building under licence from Armstrong Siddeley. The latest version develops 10,200 lb. of thrust, and Service versions are popular because of their comparatively low fuel consumption.

It is less than five years since Curtiss-Wright arranged to build this British engine in the United States. Production began in 1952, and output has now reached more than 250 a month. Aircraft powered by the J65 include the Lockheed F-104 and Grumman Tiger fighters, both of which can fly supersonic in level flight; the North American FJ-3 and FJ-4 Fury naval fighters; the Republic Thunderstreak and Douglas Skyhawk "baby atom bombers"; and Martin-built B-57 Canberra bombers.

British Sapphire-powered aircraft include the Hawker Hunter F.2 and F.5, Gloster Javelin and English Electric P.1 fighters, and the Handley Page Victor bomber. In addition, both the French Breguet and S.N.C.A.S.O. companies have Sapphire-powered aircraft; and this British engine has also been chosen for the first all-Swiss jet fighter, the Pilatus P16, which flew in the spring.

Viscount News

Overseas orders for the Vickers Viscount turboprop air liner continue to come in. Trans-Canada Air Lines want three more, bringing their total order to 25; Trans-Australia Airlines have also increased their order by three; and one has been ordered by the Government of Pakistan. The total number of Viscounts delivered or on order now exceeds 200.

Trans-Canada started Viscount services from Toronto to New York in April, and U.S. newspapermen were quick to report the new standards of comfort and speed made possible by turboprop power.

Several of the Blackburn and General Aircraft Beverley freighters on order for R.A.F. Transport Command will go into service this year. Here is the first production Beverley on a test flight.

Transport Command Build-up

More details have been released of plans to re-equip R.A.F. Transport Command with new and more efficient aircraft. Pride of the military fleet will be the big sweptwing Vickers V.1000s, each powered by four Rolls-Royce Conway by-pass turbojets and able to carry 100-150 troops for very long distances at over 600 m.p.h. They were ordered "off the drawing board" in the middle of 1954, and the prototype is expected to fly next summer.

A number of Comet 2s are being strengthened and modified for Transport Command, and should be ready for service in about six months' time.

Meanwhile, delivery of the 24 Blackburn and General Aircraft Beverleys ordered for the R.A.F. will begin in the very near future. The first production aircraft flew on 29th January this year, followed by No. 2 on 30th March. By the end of the year, eight should be in service and, according to the Secretary of State for War, they will be "probably the best large freighter aircraft in the world". Each powered by four 2,850 h.p. Centaurus piston engines, these 60-ton transports will carry 94 fully-equipped troops or 16 tons of freight for 1,000 miles, landing and taking off, when necessary, from small, rough fields or improvised airstrips.

Mid-Ocean Refuelling

During a recent two-week exercise in the Caribbean, a Martin P5M-1 Marlin flying boat of the U.S. Navy was refuelled several times in the open sea from the submarine-oiler U.S.S. *Guavina*, whilst the vessel continued under way. The tests were part of a Navy programme to develop seaplane striking forces, able to operate in enemy waters in wartime, independently of shore bases.

Australian Trainer

First aircraft produced entirely in Australia to an R.A.A.F. specification is the CA22 Winjeel trainer, which has been designed and built by the Commonwealth Aircraft Corporation at Fishermen's Bend, near Melbourne. Present rate of production is just over one a week, and it is replacing both the Tiger Moth elementary training aircraft and the Wirraway basic trainer.

The Winjeel is a sturdy side-by-side two-seater with a fixed undercarriage, and is in the same class as the R.A.F.'s Provost. Wing span is 38 ft. 9 in., length 27 ft. 2 in. and all-up weight 4,235 lb. A 450 h.p. Pratt and Whitney Wasp Junior gives it a top speed of 180 m.p.h., and it requires a take-off run of only a little over 500 ft. Special attention has been paid to economical operation, with ease of repair and maintenance; and the cowling opens "petal" fashion to give complete access to every part of the engine.

The name Winjeel is particularly appropriate to a trainer, as it is an Aborigine word meaning "young eagle."

Improved Delta

Improvements to the Convair F-102A delta-wing interceptor have added it to the select list of truly supersonic aircraft able to fly faster than sound in level flight for long periods. The changes include a longer fuselage, streamlined fairings on each side of the jet exhaust, slightly upswept wing-tips, redesigned engine air intakes, a "drooping" wing leading edge and redesigned cockpit hood to give the pilot better visibility.

The single-seat F-102A has a 10,000 lb. thrust Pratt and Whitney J57-P-11 turbojet, with afterburner. It spans 37 ft. and is 57 ft. long.

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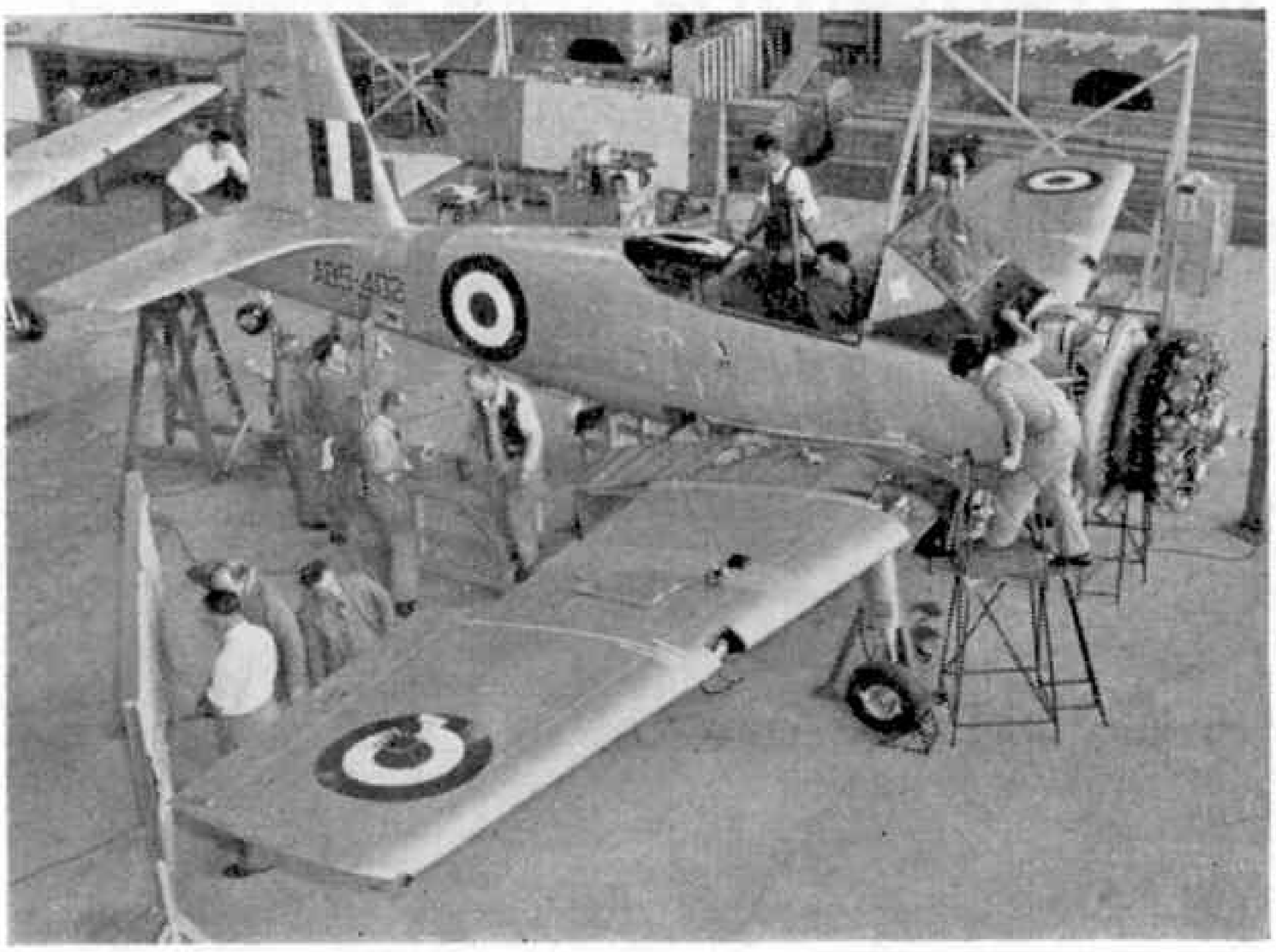
Two Auster Aiglet lightplanes flew more than 32,000 miles in seven weeks to aid victims of this year's disastrous floods in Australia.



New trainers for the Royal Australian Air Force. Production line of the CA22 Winjeel at the Commonwealth Aircraft Corporation's plant, Fishermen's Bend, Victoria. R.A.A.F. Official photograph.

The assembly of engines for model aircraft in the works at Barnoldswick of Davies, Charlton Ltd., to whom we are indebted for our illustrations.

Engines in Miniature

By R. R. Waterhouse

A FASCINATING new industry has brought fame to Barnoldswick, a town of 11,000 inhabitants on the Yorkshire and Lancashire border, 35 miles from Leeds and the same distance from Manchester. This is the making of tiny diesel engines for model aeroplanes. At first it was entirely a home trade. Now these little aero-engines go to many lands.

The British Empire takes many thousands of them every year, and other markets include the Continent of Europe, Morocco, French Indo-China and the Argentine—one of the newest fields of engineering enterprise. It is interesting that these little engines should be made in Barnoldswick, because there the famed Rolls-Royce "jet" aero-engines are tested, some being actually constructed at the local factory, which is now an experimental works.

Schoolboys were the first to show an interest in the new type of miniature aeroplane, as distinct from the old cardboard and elastic model. But the interest nowadays is by no means confined to boys. Their fathers, uncles and grandfathers have taken up this fascinating hobby and model aero-clubs flourish all over the country. There is also keen International rivalry in this as in other fields. In the near future a model aircraft fitted with a Barnoldswick made engine will attempt to break two world records. They are both held by the Russians at present. The first will be an attack upon the altitude record, the second an attempt on the duration record, which was established by a plane that remained in the air for 3 hrs. 48 mins. 45 secs.

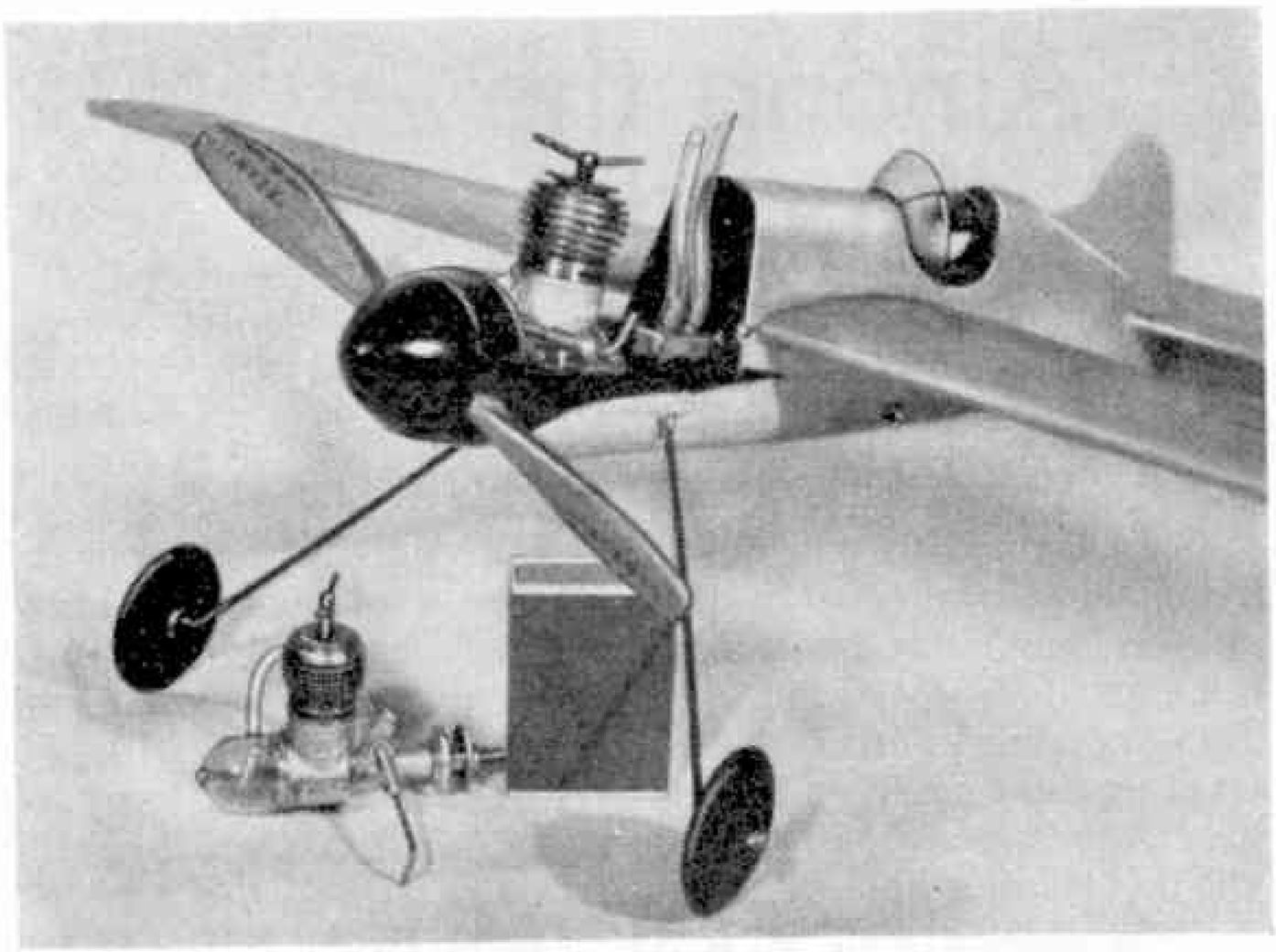
There is among experienced engineers and aeronautical "fans" a feeling of confidence that Britain will put up a very good show indeed in both record attempts. And if these little engines do as well in the sphere of international competition as the big jet engines from Barnoldswick have done, there will be no cause for complaint.

There are two workshops in which these miniature engines are produced, and making them is an intricate process. The engineers work to very fine limits indeed. By ordinary standards one thousandth part of an inch would appear to give a close fit, but these skilled men work to a limit of one ten-thousandth part of an inch, which is about a tenth of the thickness of a piece of cigarette paper!

Aeronautical experts may be interested to learn that two million of the smallest of these model engines would be required to equal the power of a Rolls-Royce "Merlin" engine. They are smaller than matchboxes, and each has a businesslike name. Among them are the Marine Dart and the Mk.II Dart, both of 0.55 c.c.; the Spitfire, 1 c.c.; the Marine Javelin and the Mk.II Javelin, both of 1.49 c.c.; and the 3.5 c.c. D.C. 350 (G) and the D.C. 350.

Grinding the bore is an important stage in the production of these miniature engines. The finish on the crankshaft, piston and liner is largely dependent on the skill of the operator and the accuracy of the grinding machine. For this reason all the grinders are mounted on ten-ton blocks of concrete surrounded by a six-inch layer of sand, in order to isolate them from all sources of vibration. The wheels are periodically trimmed with an industrial diamond costing as much as £80.

Another important operation is that of honing the bore. Going round the well-appointed works you may, for instance,



A 3.5 c.c. engine fitted in a model aircraft. Alongside is an 0.5 c.c engine with a matchbox to give some idea of its size.

see an operator using the latest Delapena honing machine on the cylinder of a Spitfire. The liners, made from high tensile nickel-chrome steel, are drilled reamed, hardened and ground before the final honing, which ensures that each piston is a dead fit in its accompanying bore. Holding the liner in a special chuck, the operator "feels the fit" by means of the piston, a job he does many times before a perfect compression seal is ensured.

The machine platform is kept absolutely clean. This is vitally necessary for precision honing. From a flexible pipe above the hone, soluble oil flows continuously while the job is in progress.

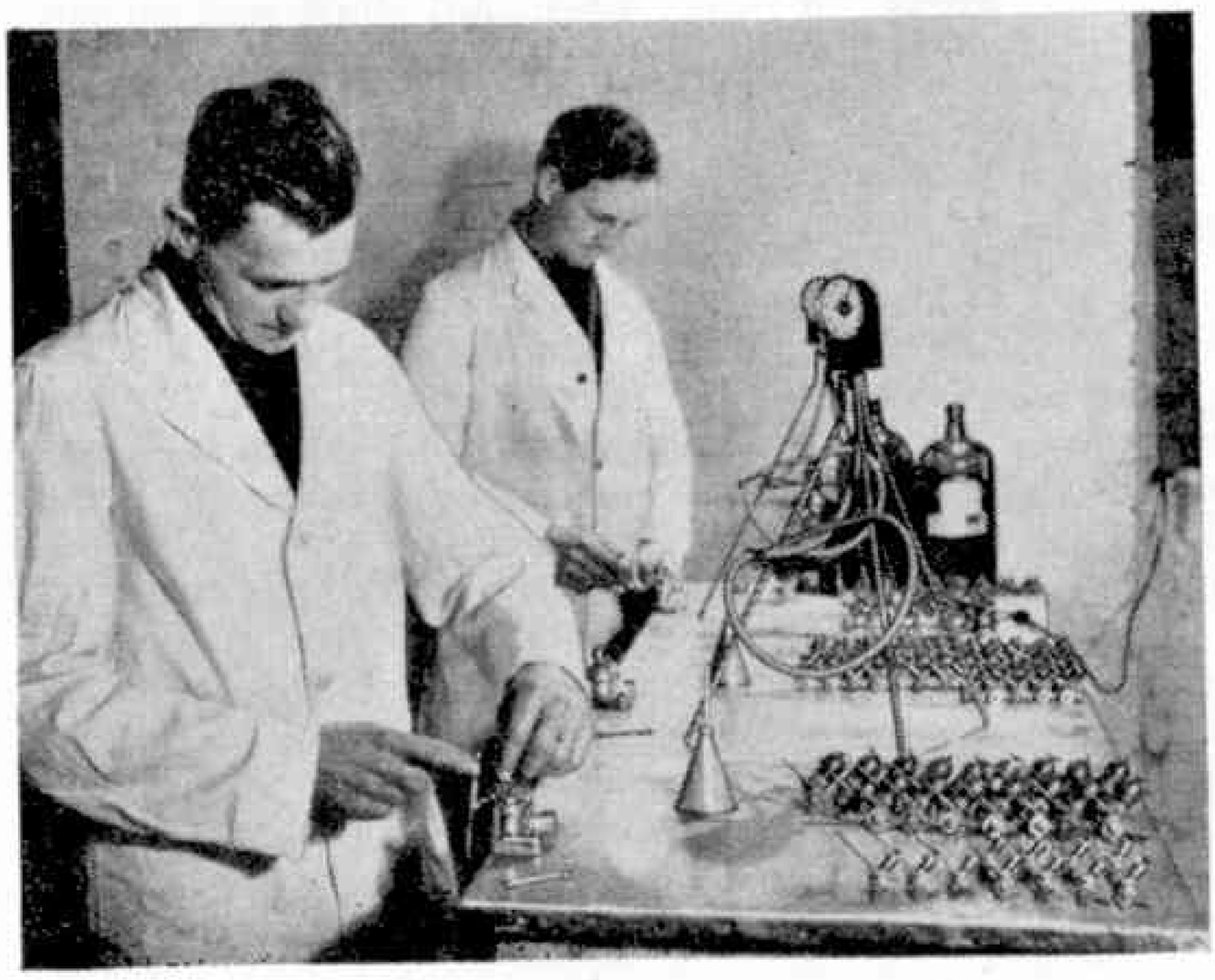
The visitor finds great interest in watching skilled hands deal with a Dart crankcase, formed from a special light alloy by pressure die-casting. Jig drilling is one of the numerous operations to which the casting is subjected. There are seven drilling operations for each crankcase, besides the cutting of the threads for the backplate and cylinder liner.

Before the casting of the crankcase, special steel dies are fabricated by skilled tool makers, who spend many hours at the intricate job of shaping the steel by hand. The finished die is finally subjected to a hardening process. Prior to this, however, an experimental batch of crankcases is cast. These are used to make up several prototype engines, which are submitted to exhaustive tests. When the engineers have found that no alterations are necessary, either for reasons of production or performance, the die is hardened.

Even a simple part in a model aero-engine may have a considerable number of machine operations. Take, for example, the cylinder head, which begins life as a section of dural bar stock, fed through the hollow mandrel of a lathe. The first process is to drill and tap the bore, and then "rough turn" it to shape. The head is then parted off.

The roughly formed head is next screwed to a mandrel for the second operation. After turning the cooling fins with a gang of tools, the craftsman drills and taps the hole for the compression screw, and then machines the face. The head is then passed to a second operator, who machines the spanner flats on a horizontal milling maching before "final de-burring, inspection and electrical anodising."

The flow of parts and unit assemblies from the various machine shops in the factory eventually reach the Assembly Department. Here absolute cleanliness is of course essential; and for that reason the firm insists on metal-topped benches, which are the easiest to keep clean. Every part of every engine is thoroughly cleaned and oiled before assembly.



Miniature engines on final assembly tests.

Among the Model-Builders

By "Spanner"

A Front Wheel Drive Mechanism

Fig. 1 on this page shows an efficient front wheel drive axle suitable for use in models such as four wheel drive Army vehicles. The axle is fitted with a differential mechanism, and the arrangement enables the wheels to be fully steerable when the vehicle is in motion.

The crown wheel of the differential fitted in this mechanism is a 1½" Contrate 1, which is mounted freely on the Rod forming one of the half-shafts. A ¾" Contrate 2 is fixed on the same Rod and two 1" Screwed Rods are fixed by two nuts each in diametrically opposite holes in the Contrate 1. The inner end of the

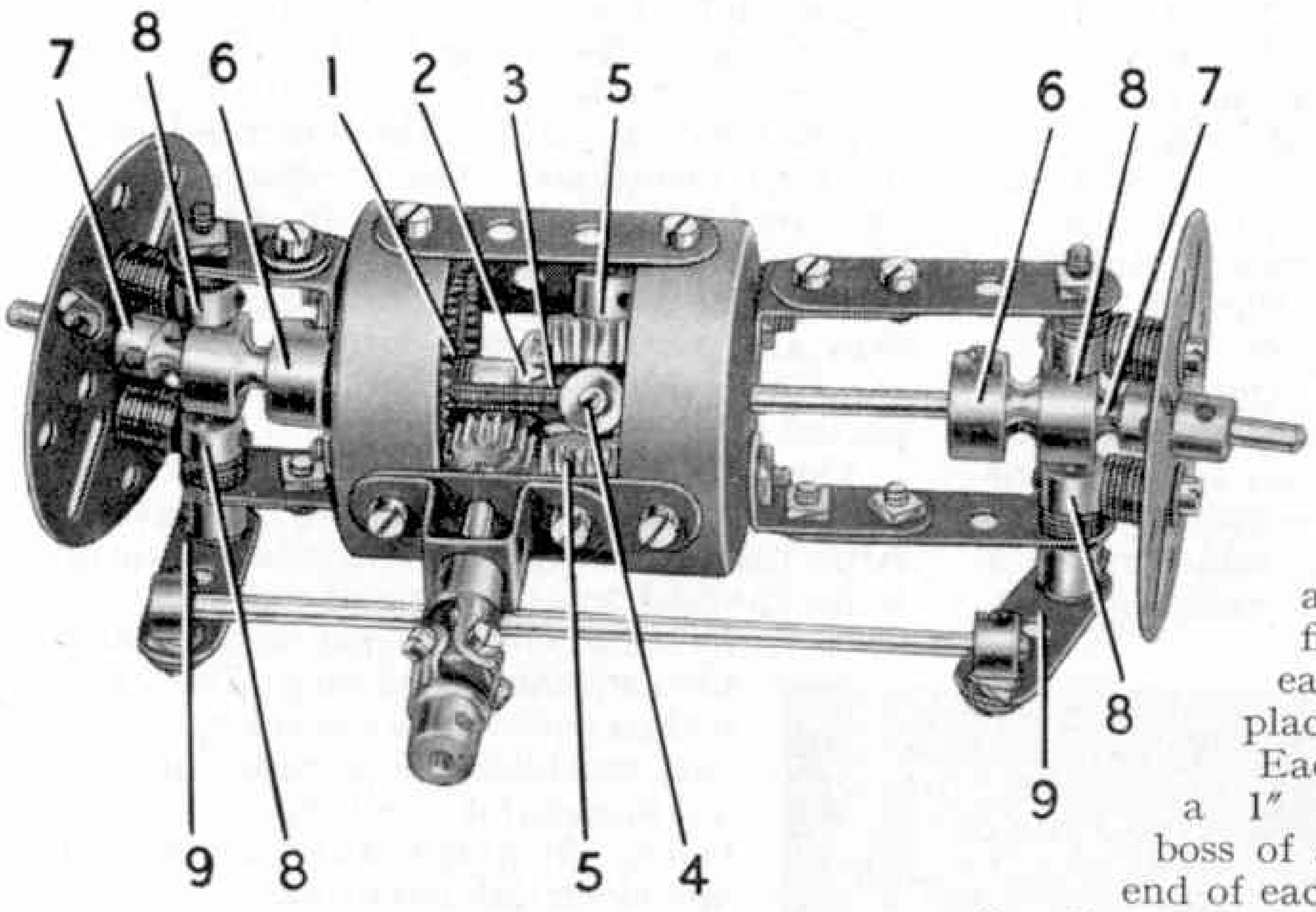


Fig. 1. The front wheel drive mechanism that is described in detail on this page.

half-shaft passes into one end of the bore of a Coupling 3, in the centre cross hole of which a 1½" Rod 4 is fixed. This Rod is gripped at each end in a Collar screwed on to the end of one of the Screwed Rods.

Two ¾" Pinions 5 turn freely on Pivot Bolts screwed into the Coupling 3. The Pinions engage the Contrate 2 and another similar Contrate fixed on a Rod that forms the second half shaft.

The complete differential is mounted in a casing made from two Boiler Ends connected by four 2" Strips. One of the Strips is spaced from the Boiler Ends by two Washers on each of the Bolts that hold it in place, and to this Strip is bolted a Double Bent Strip.

B. A. Crack, Bury St. Edmunds, one of the many model-builders who have been successful in "M. M." Model-Building Competitions.

The driving gear is a ½" Pinion that engages the Contrate 1. The Pinion is fixed on a 1½" Rod mounted in the Double Bent Strip and the 2" Strip. Washers are placed on the Rods to ensure that the Contrates and the Pinions mesh accurately.

The differential casing is extended on each side by two 1" × ½" Angle Brackets bolted to the Boiler Ends. Those on one side have their slotted holes covered by Fishplates, and to those on the other side two 2" Strips are bolted. A Collar is fixed to the outer end of each half shaft and on it is placed a Socket Coupling 6. Each front wheel is fixed on a 1" Rod supported in the boss of a Face Plate. The inner end of each Rod carries a Handrail Coupling 7 that fits into the end of one of the Socket Couplings 6. Each Handrail Coupling is fitted with a 7/32" Grub Screw screwed into the threaded hole opposite to the standard Grub Screw provided in the rounded end. The two Grub Screws are tightened against each other so that they cannot come unscrewed, and the projecting head of the 7/32" Grub Screw engages the slot in the Socket Coupling. This arrangement permits the Handrail Couplings to pivot in the Socket Couplings as the front wheels are steered, although they rotate as a unit owing to

the engagement of the Grub Screws in the slots.

Two ½″ Bolts are passed through each Face Plate and each is fitted with Washers before it is screwed into a Collar 8. The upper Collar on each side is fixed on a Threaded Pin, and the lower Collar is held on a 1″ Rod. Cranks 9 on the 1″ Rods are connected by a Rod fixed in two Collars, each of which is screwed on to a bolt held by a nut in one of the Cranks.

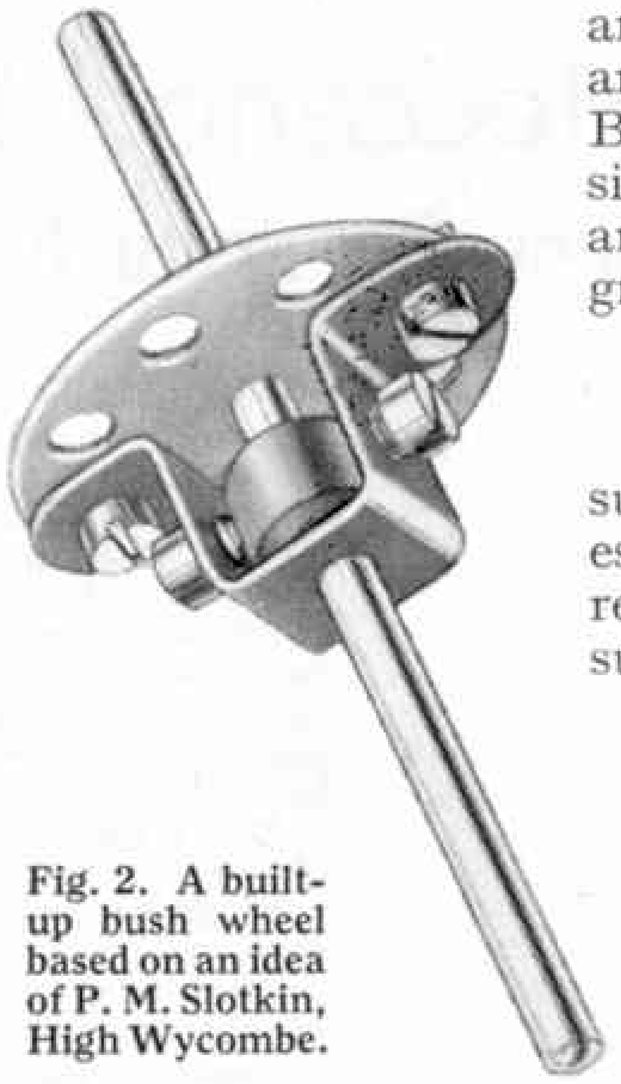


Fig. 2. A built-up bush wheel based on an idea of P. M. Slotkin, High Wycombe.

A Made-up Bush Wheel

Some time ago I received a letter from P. M. Slotkin, High Wycombe, Bucks, who owns a No. 6 Outfit and is a very keen model-builder. During the course of his model-building activities he has found occasional need for an extra Bush Wheel to the one included in his Outfit. After a little experimentation he devised the simple arrangement seen in Fig. 2, and he sent details of it to me in the belief that other model-builders might find the scheme useful in similar circumstances, when the lack of a proper Bush Wheel might hold up their activities.

The arrangement is quite simple and is made by bolting a Double Bent Strip to a Wheel Disc. Either the eight-hole Wheel Disc or the new Wheel Disc with six holes can be used for this purpose. A Rod is passed through the centre hole of the Wheel Disc and the Double Bent Strip, and carries a Collar between the arms of the Double Bent Strip. Bolts are then passed through the side holes of the Double Bent Strip and are screwed into the Collar to grip the Rod.

An Outstanding Model

Models of the less common subjects are always interesting, especially when they have such a realistic appearance and display such excellent workmanship as the model of a large planing machine built by our old friend B. W. Rowe, Newton Abbot, which is illustrated on this page. I do not remember ever having seen a better model of this type and readers may be interested to know that it is based on a machine manufactured by John Stirk and Sons, Halifax, which was illustrated in the *M.M.* some years ago.

Operated by two Electric Motors, the model has all the essential movements, tool saddle and tool holder feeds of its prototype, and the reciprocating movement of the workbed is entirely automatic in action. Well-proportioned, neatly and sturdily constructed, the model is altogether an outstanding example of Meccano construction, and well up to the standard I have come to expect from this very enthusiastic and experienced model-builder.

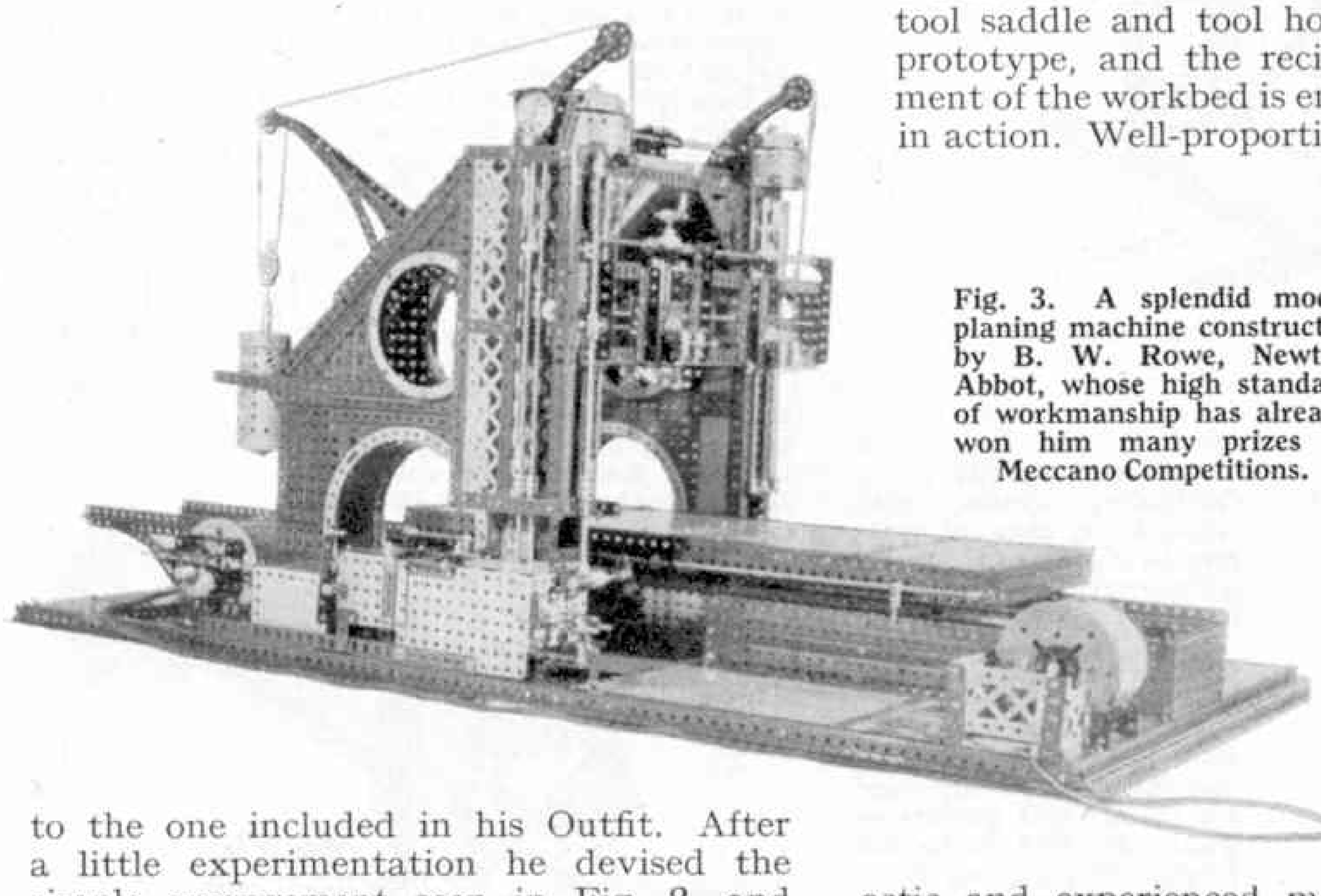


Fig. 3. A splendid model planing machine constructed by B. W. Rowe, Newton Abbot, whose high standard of workmanship has already won him many prizes in Meccano Competitions.

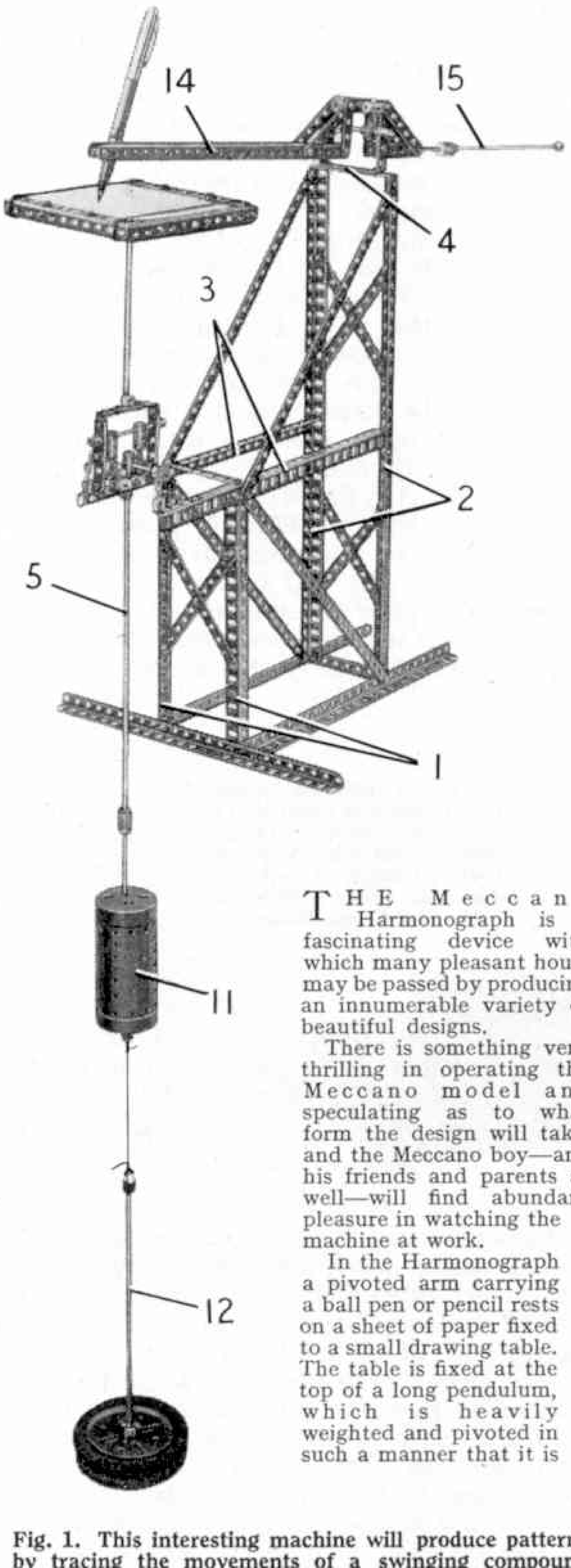
The saddle is counterweighted by means of Boilers filled with odd parts and has helical gearing situated in the housings at the tops of the columns.

The twin tool saddles are independently controlled from the main distribution box, and the main horizontal saddle is raised and lowered by a screw mechanism consisting of 11½″ Screwed Rods.

The machine will actually plane blocks of soft material such as wax and is nearly 4 ft. in length and over 2 ft. in height.

New Meccano Model

A Fascinating Designing Machine



THE Meccano Harmonograph is a fascinating device with which many pleasant hours may be passed by producing an innumerable variety of beautiful designs.

There is something very thrilling in operating the Meccano model and speculating as to what form the design will take, and the Meccano boy—and his friends and parents as well—will find abundant pleasure in watching the machine at work.

In the Harmonograph a pivoted arm carrying a ball pen or pencil rests on a sheet of paper fixed to a small drawing table. The table is fixed at the top of a long pendulum, which is heavily weighted and pivoted in such a manner that it is free to move in any direction when the pendulum is set swinging. As the table moves the pen traces on the paper a design. The design varies according to the direction and extent of the movement of the pendulum and some of these assume very intriguing and beautiful forms. Further variety can be produced by varying the mass of the weight and by altering the length of the pendulum. Also if instead of only one pendulum, two or more are employed and so arranged that their combined movements operate the same pencil the resultant designs become much more complex and beautiful.

Fig. 1. This interesting machine will produce patterns by tracing the movements of a swinging compound pendulum.

The Harmonograph is so simple that the youngest child can obtain successful results. All that is necessary is to clamp a sheet of white paper to the table of the machine using Driving Bands, fit a ball pen to the pivoted arm and then set the pendulum rod and weights swinging.

Construction of the model is begun by assembling a simple but strongly braced frame to support the pendulum and table and the pen arm. The main uprights of this frame are two $9\frac{1}{2}$" Angle Girders 1 and two $18\frac{1}{2}$" Angle Girders 2 (Fig. 1). These are connected at the base by a $3\frac{1}{2}$" Strip and three $12\frac{1}{2}$" Angle Girders, and two $12\frac{1}{2}$" Angle Girders 3 are bolted between the Girders 2 and the top ends of Girders 1. A $3\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip 4 is fixed between the upper ends of Girders 2 and the frame is braced by $5\frac{1}{2}$" and $12\frac{1}{2}$" Strips.

Two $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips, each fitted with a Double Arm Crank are connected by two $2\frac{1}{2}$" Strips. A $6\frac{1}{2}$" Rod is held in the upper Double Arm Crank and to its top end is fixed a Bush Wheel. The latter is bolted to two $5\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips, which are attached to two of the four $5\frac{1}{2}$" Angle Girders that form the table to which the paper is fixed. The face of the table is filled in with three $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates. An $11\frac{1}{2}$" Rod 5 is held in the lower Double Arm Crank and forms part of the pendulum.

The frame that supports the table and pendulum is mounted universally, which means that it is free to move in all directions, on special bearings designed to reduce friction to the minimum. These are known as "knife-edge" bearings, and they make use of the Meccano Centre Fork. A close-up view of the arrangement of these bearings is shown in Fig. 3 and it will be seen that a Centre Fork 6 is held in a Rod Socket fixed to each of the Girders 3. Two further Centre Forks 7 are held in Couplings fastened on a $3\frac{1}{2}$" Rod, and this Rod is fixed in Double Arm Cranks 8 bolted to the pendulum and table frame.

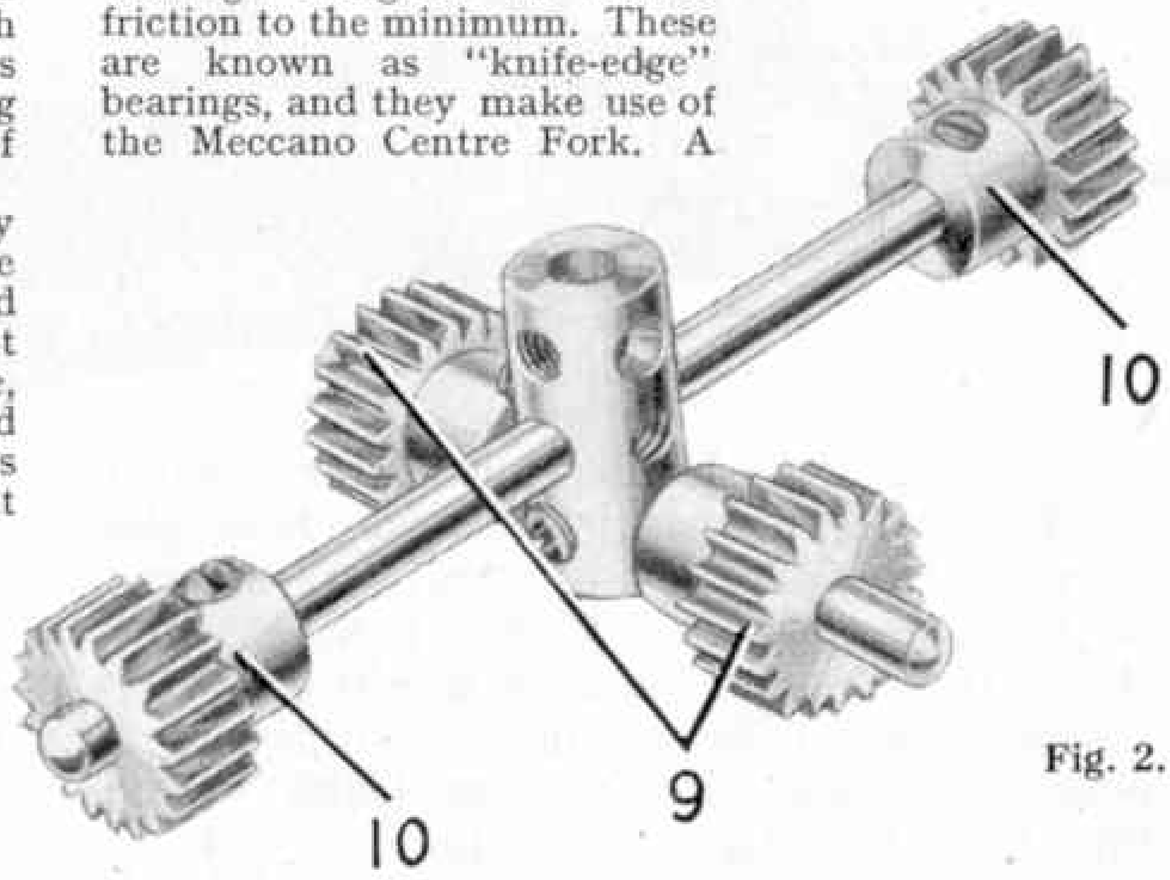


Fig. 2.

The other section of the knife-edge bearing unit is

shown separately in Fig. 2. Two ½" Pinions 9 are fixed on a 2" Rod held in a Coupling that supports also a 3½" Rod that carries two ½" Pinions 10. The Pinions 10 rest on the Centre Forks 6, and the Centre Forks 7 are arranged so that their prongs are located between the teeth of the Pinions 9.

The Rod 5 is extended by an 8" Rod connected to it by a Coupling, and a Boiler 11 is placed on this Rod. The lower end of the Rod carries an End Bearing and this is connected by Cord to another End Bearing on an 11½" Rod 12. Two 3" Pulleys with Tyres are fixed on Rod 12 to form bob weights, and the Boiler 11 should be heavily weighted by placing in it any suitable parts left over when the model is completed. This arrangement forms a compound pendulum, and when the two weights on it are set swinging in different directions they impart a complicated motion to the drawing table above them.

The centre section of the pen arm consists of two 2½" Strips 13 connected by two Double Brackets, and fitted at each end with 2" and 3" Strips as shown. The lower ends of the 2" Strips also are connected by Double Brackets, and on one side the 2" and 3" Strips support two 12½" Strips 14. The 2" and 3" Strips on the other side are connected by 2½" Strips, the outer ends of which are joined by a Double Bracket. An 11½" Rod 15 is held by Collars in the Double Brackets at this end of the pen arm.

The pen arm also is mounted on knife-edge bearings, as shown in Fig. 4. Two ½" Pinions 16 are fixed on a 3½" Rod held in Cranks bolted to a 2½" × 1½" Double Angle Strip attached to Double Angle Strip 4. Two Couplings 17, one on each side, are fixed on 2" Rods passed through the pen arm, but spaced from it by Washers on the Rods. A Centre Fork held in each Coupling rests between the teeth of one of the Pinions 16.

A ball point pen is placed between the ends of Strips 14, and two ¾" Bolts, passed through holes in the Strips, are used to clamp the pen in position. A sliding balance weight 18, which in our model is a ½" diam. ¾" face Pinion, is placed on Rod 15, so that when the weight is moved to the outer end of the Rod the pen is raised clear of the table. By sliding the weight inward the pen is lowered until it rests on a sheet of paper clamped to the table by Driving Bands.

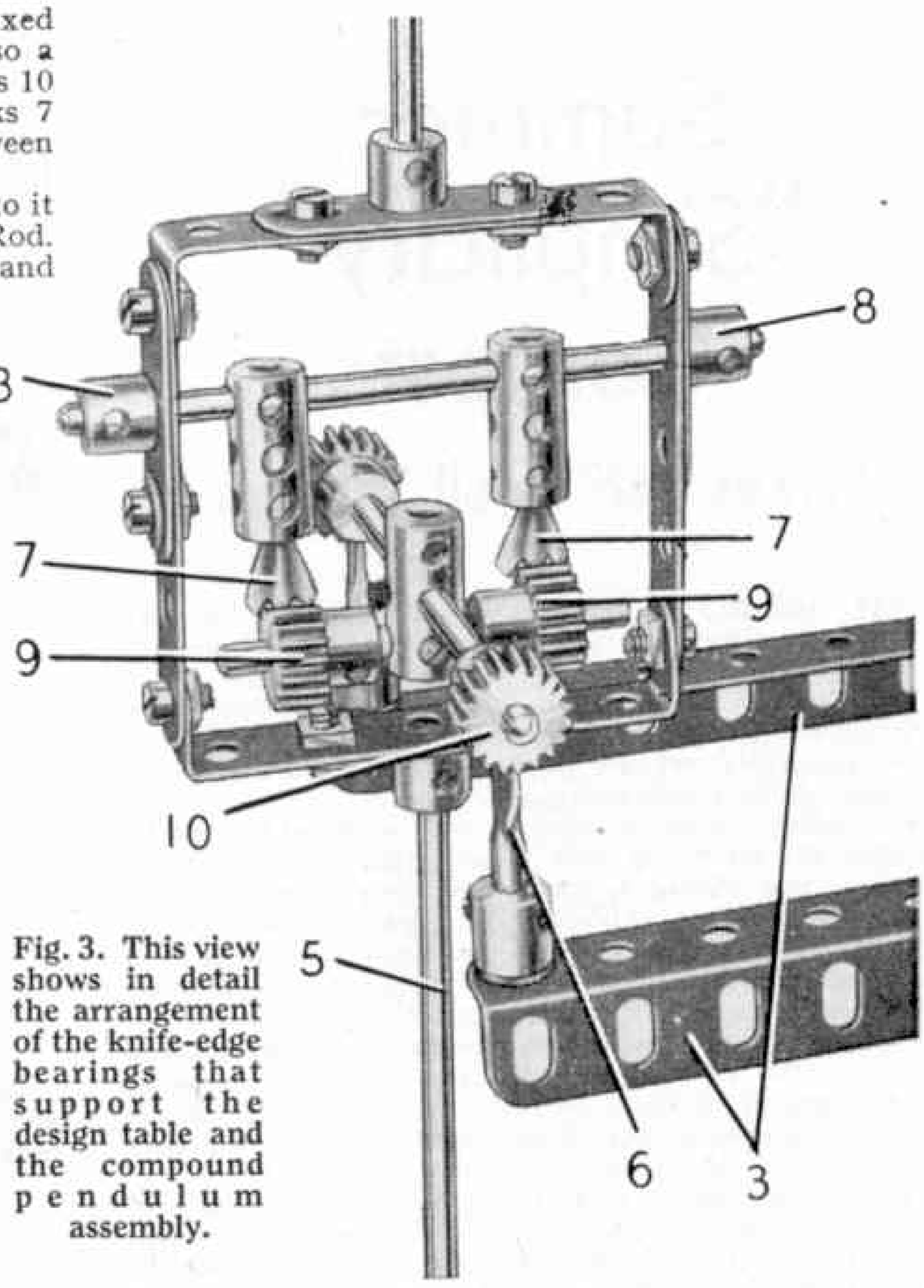


Fig. 3. This view shows in detail the arrangement of the knife-edge bearings that support the design table and the compound pendulum assembly.

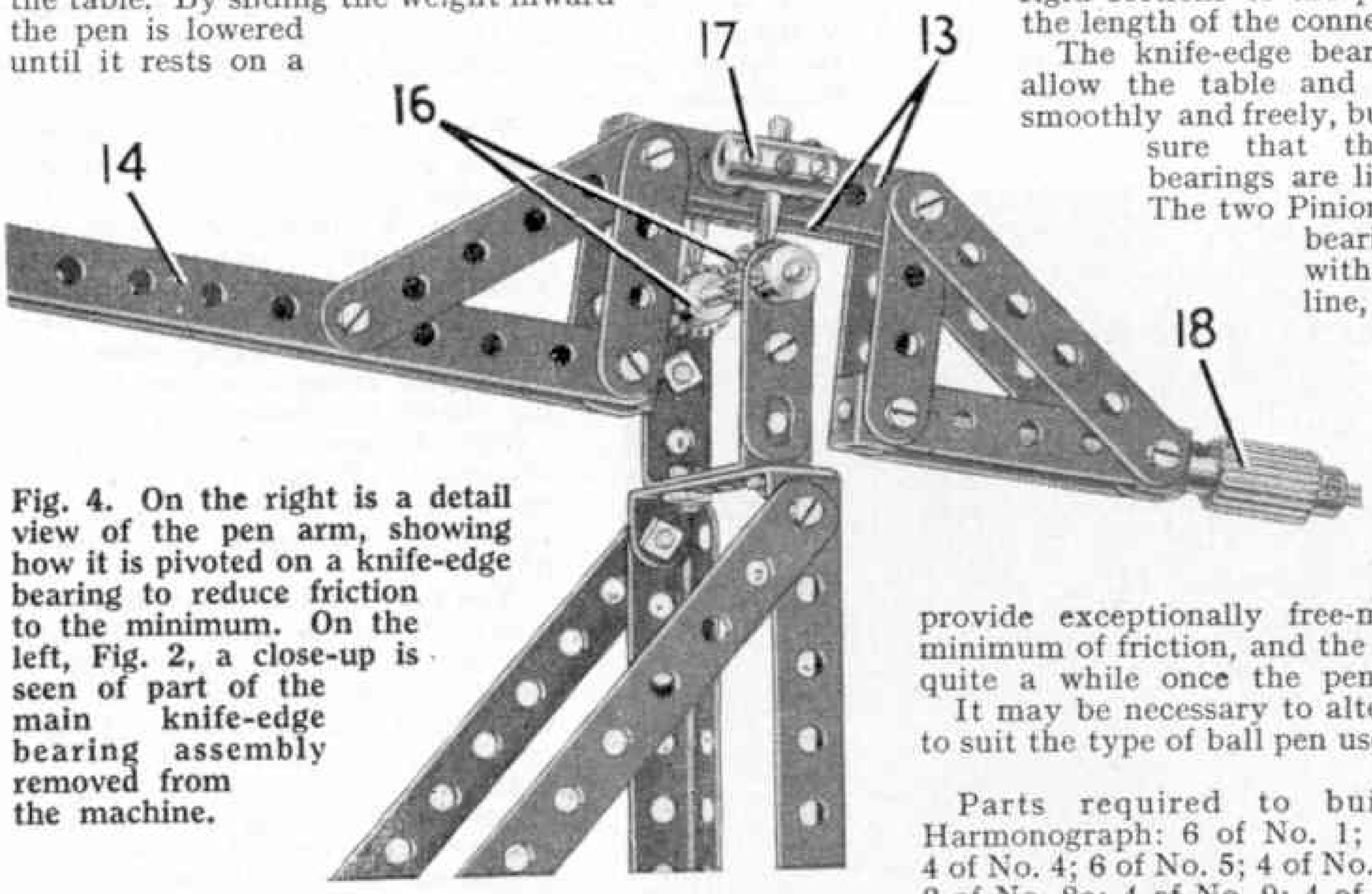


Fig. 4. On the right is a detail view of the pen arm, showing how it is pivoted on a knife-edge bearing to reduce friction to the minimum. On the left, Fig. 2, a close-up is seen of part of the main knife-edge bearing assembly removed from the machine.

To operate the model first the pen should be raised clear of the paper, and then the pendulum should be set swinging. Then the pen can be brought into contact with the paper when it will commence to trace a pattern governed by the swing of the pendulum. The swing can be varied in many ways by making use of the compound pendulum with its two weights, and further variety can be introduced by altering the values of the weights and by adjusting the relative lengths of the two rigid sections of the pendulum, or by altering the length of the connecting Cord.

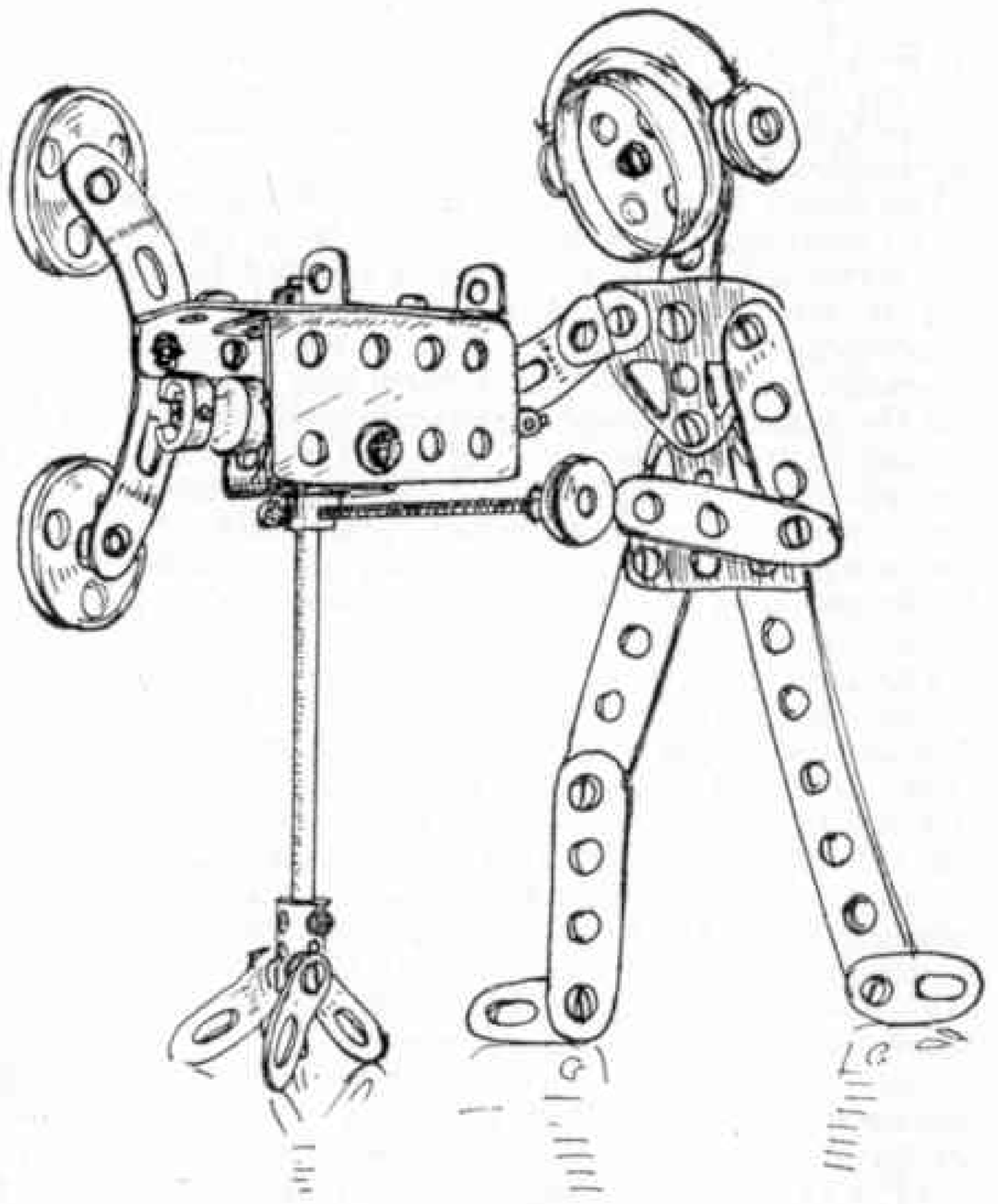
The knife-edge bearings used in the model allow the table and the pen arm to move smoothly and freely, but it is necessary to make sure that the components of the bearings are lined up very accurately. The two Pinions that form part of each bearing must be arranged with their teeth exactly in line, and the prongs of the Centre Forks must be parallel to the teeth while the Centre Forks themselves must be in line with each other. If the parts are assembled carefully they provide exceptionally free-moving bearings with a minimum of friction, and the model should operate for quite a while once the pendulum starts its swing.

It may be necessary to alter the value of weight 18 to suit the type of ball pen used.

Parts required to build the Twin-Elliptic Harmonograph: 6 of No. 1; 6 of No. 2; 2 of No. 3; 4 of No. 4; 6 of No. 5; 4 of No. 6; 2 of No. 7a; 5 of No. 8; 2 of No. 8a; 4 of No. 9; 4 of No. 11; 3 of No. 13; 1 of No. 13a; 1 of No. 14; 3 of No. 16; 3 of No. 17; 2 of No. 19b; 1 of No. 24; 6 of No. 26; 1 of No. 26b; 72 of No. 37a; 70 of No. 37b; 40 of No. 38; 1 of No. 40; 1 of No. 47; 2 of No. 48a; 1 of No. 48b; 2 of No. 48d; 3 of No. 59; 2 of No. 62; 4 of No. 62b; 6 of No. 63; 6 of No. 65; 2 of No. 111; 2 of No. 142b; 1 of No. 162; 2 of No. 166; 2 of No. 179; 2 of No. 186c; 3 of No. 192.

Summer "Simplicity" Contest

Prizes for Small Models



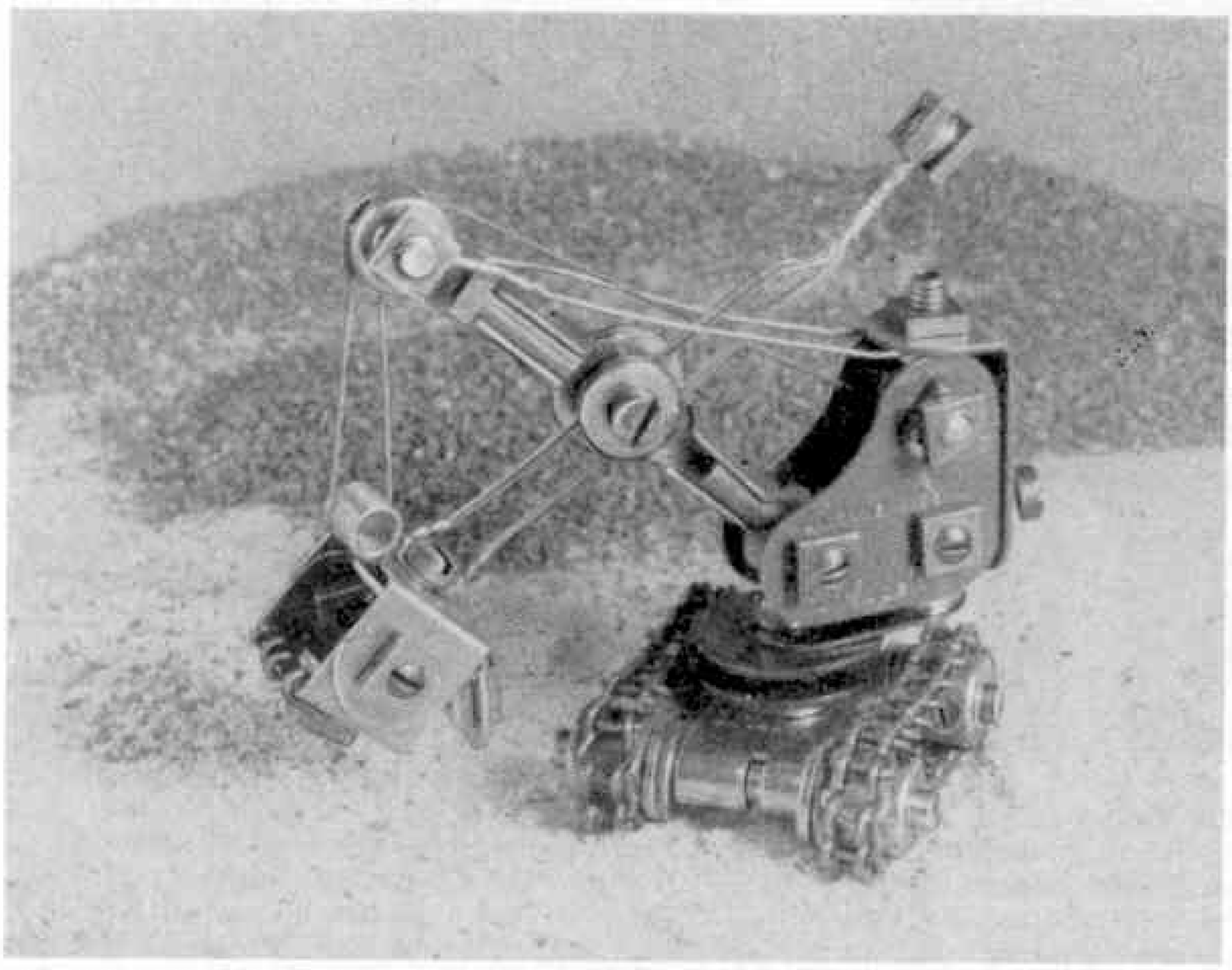
"The Cameraman" by Raymond G. Holding, Colwyn Bay, N. Wales. This is a fine example of "Simplicity" model-building and was awarded a prize in a previous competition.

LAST month we announced full details of the special "Simplicity" Competition that we are running throughout the summer months. The object of this Competition is to provide a pleasant way for model-builders to while away a short spell indoors when inclement weather prevents them from indulging in their outdoor summer pastimes.

Simplicity model-building is very easy and a model suitable for entry in this Competition can be built up in a few minutes. As there are no restrictions on the choice of subject, and the Competition is open until 31st August next, we expect to receive a large number of entries, and there is sure to be keen competition to win the fine Cash Prizes that we are offering for the most ingenious and life-like models sent in. As you may not have seen the original announcement of the Competition in the June *M.M.* we are repeating the main details here, together with a list of the prizes.

In entering this Competition you have to try to build a realistic model using the smallest possible number of parts. Now this kind of model-building is great fun; if you have never tried it you can have no idea of its fascination and of the remarkable effects that can be obtained.

This is what we call "Simplicity" model-building, and from the two models illustrated on this page you will see the kind of thing we have in mind. You will notice that while each model contains only a small number of parts, it has an air of reality about it and there is no mistaking what it represents. You will find that there is plenty of scope for you to exercise your skill and almost no limit to the number of subjects, humorous or otherwise, that you can model in this way. First select some simple subject and then try to make a simple model of it, using the smallest number of Meccano parts that you can. You can use any parts you like from the entire Meccano range, but the important thing is to use the fewest possible without spoiling the realism of the finished model.



A "Simplicity" model Mechanical Shovel built by Lyn Holman, Redruth, Cornwall, and photographed in a realistic setting.

When you have made a model—and it need not take more than a few minutes—make a good sketch of it, or obtain a photograph, and send this to *"Simplicity Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13."* Please don't forget to write your age, name and address on the back of the sketch or photograph.

The Competition is open to readers of all ages in any part of the world, and entries may be sent in at any time up to 31st August next.

You may send as many entries as you wish, but no single competitor can win more than one prize. If two or more entries are sent they will be grouped together and judged on their joint merits.

If you will be 12 years of age or under on 31st August next your entries will be placed in Section A. If you will be over 12 on that date, your entries will go into Section B.

The following set of prizes will awarded in each Section. First, Cheque for £4/4/–; Second, Cheque for £3/3/–; Third, Cheque for £2/2/–. There will be also Five Prizes each of £1/1/– and Ten Prizes of 10/6 in each Section.

Club and Branch News

WITH THE SECRETARY

THE CLUB LIBRARY

The majority of Meccano Clubs, including quite small ones, run a Club library, built up of books and magazines donated by members or their parents, and of periodicals bought out of Club funds. In some Clubs this literature is circulated free; in others a small weekly charge is made.

In small Clubs the Secretary generally looks after payments of this kind. In Clubs that have a fairly large library the Secretary is relieved of work in connection with it by the appointment of a member as Librarian. In addition to keeping a record of books lent to members, and of payments and dues if these are charged, the Librarian is also responsible for seeing that the books and magazines are kept in good condition. This is always a problem, and the best way of solving it is to cover each book or magazine with a brown paper wrapper, otherwise the handling to which the books and magazines are subjected will soon reduce them to a very worn condition.

Clubs running a library in which this precaution has not been taken can usefully devote a wet summer evening to the job of backing all the books and magazines in this way, each member giving a hand. It will be necessary to ensure beforehand that an adequate supply of clean, uncrumpled brown paper is available.

CLUB NOTES

BURY GRAMMAR SCHOOL M.C.—During the summer a series of meetings is being held during which members are repairing the Club's Hornby-Dublo track. Club roll 12: *Secretary:* I. A. Stockley, 22 Benson Street, Bury, Lancs.

LUMINA (LONDON) M.C.—The Club has settled down in its new Headquarters. A series of experiments with the Club's Hornby-Dublo track, locomotives and rolling stock are being carried out before deciding upon a permanent layout. The Leader is building a model of an "Atlantic" class steam locomotive. Club roll: 17. *Secretary:* J. A. Kirby, 9 Busby Place, Kentish Town, London N.W.5.

HOLLAND

NIJMEGEN M.C.—The Club's 1955 Exhibition was a great success, and there were over 1,000 visitors. The Exhibition included a very fine display of large working Meccano models arranged on tables. Current was supplied to these models through a miniature electric power station from which "high tension" cables extended to a pylon on each table. *Secretary:* J. W. Geurts, Haterseweg 241, Nijmegen, Holland.

SOUTH AFRICA

CAPE PENINSULA M.C.—Members have visited the Cape Dried Fruit factory in Cape Town, where they were greatly interested in the way dried and glazed fruit is packed and crated. At an Open Night parents and friends were invited to see for themselves the model-building activities of the Club. *Secretary:* M. Adler, 10 Lisdale, Beach Road, Sea Point, Cape Town, South Africa.

BRANCH NEWS

DROYLSDEN COUNTY SECONDARY SCHOOL — Rapid progress has been made with the new Hornby-Dublo layout. An interesting change from normal Branch routine has been a short tour of the district with a model railway Exhibition. *Secretary:* J. Lawton, Droylsden County Secondary School, Manor Road, Droylsden.

HINDHEAD AND DISTRICT—A party of 14 members visited the Model Railway Exhibition in London last April, and gained some valuable hints from the layouts displayed. Two members took part in the Railway Enthusiasts Club's outing "The South Midlander," a tour of W.R. closed branch lines. *Secretary:* B. J. Hinde, "Hindhead Brae," Hindhead, Surrey.

ABBEYFIELD ROAD—Meetings are now held fortnightly. The Branch layout has been mounted on a baseboard. Outdoor activities include cricket matches. *Secretary:* R. North, 132 Abbeyfield Road, Sheffield 4.

HALE END—The Branch baseboard is almost completed. It has been built with hinged sides so that it can be folded up like a cabinet and easily packed away, as the Branch room is used by other organisations. The planning of the new layout for this baseboard is proving most interesting. A visit has been paid to Bricklayers Arms and Hither Green locomotive depots, where members saw a variety of S.R. engines. *Secretary:* A. Coe, 463 Hale End Road, Highams Park, London E.4.

Members of the recently-incorporated H.R.C. Branch of the Edlington County Secondary School, Doncaster, with their layout. This fine layout has been considerably developed since this photograph was taken a year ago.

HORNBY RAILWAY COMPANY

By the Secretary

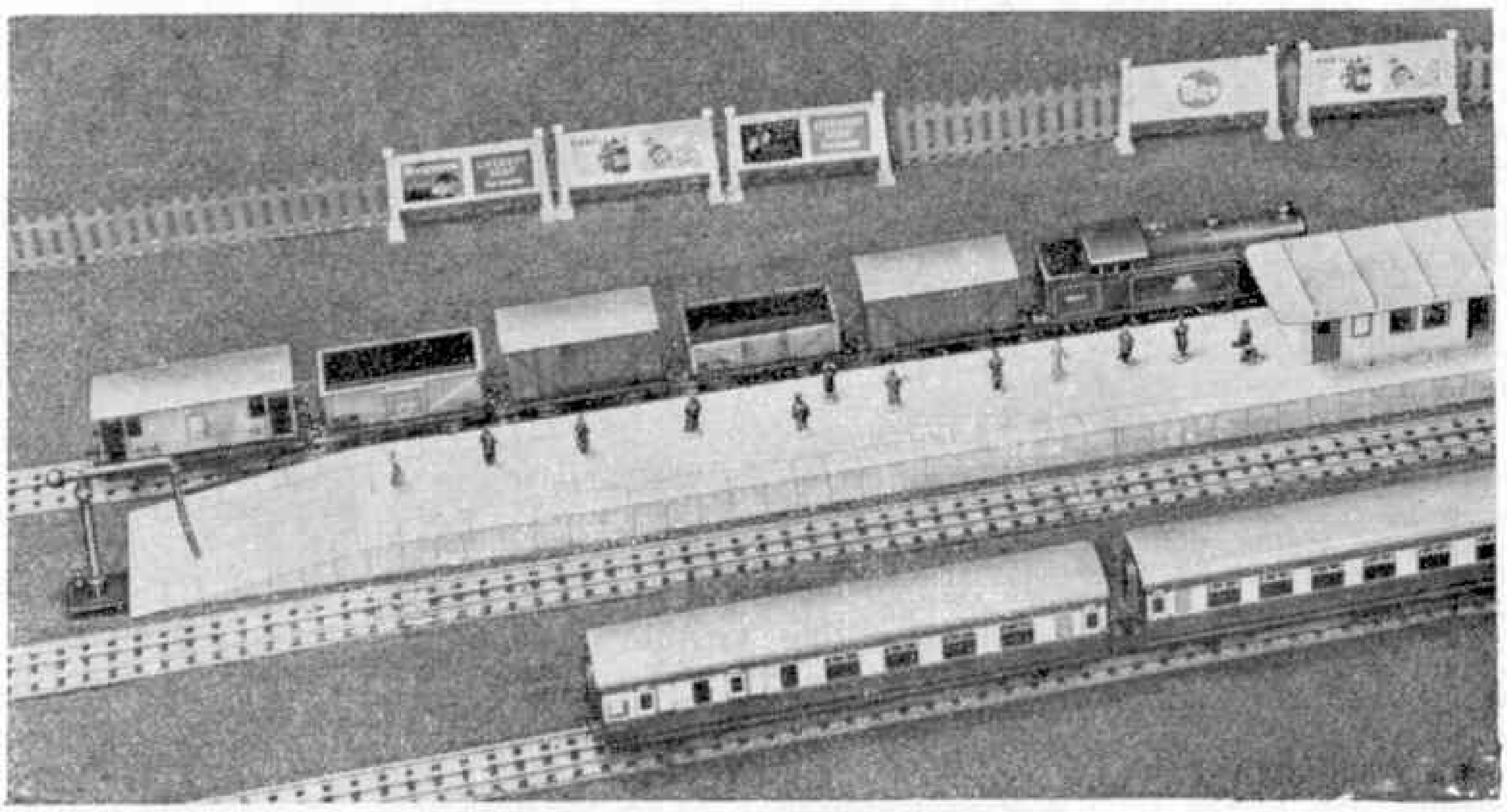
More New Things for Hornby-Dublo

I KNOW that all Hornby-Dublo enthusiasts look forward eagerly to news of additions to the system and I am always pleased when I am able to tell you about them. This month's illustrations will certainly catch your attention, because they show in use something that many of you have asked for many times.

Platform Extensions—for these are the parts in question—are now making their appearance, and if you have not yet been lucky enough to see any of these about you should be able to shortly. It has always been the intention to provide these as part of the general station scheme, but until recently it has not been possible to produce them in the quantities required. It is safe to say that practically every owner of a Hornby-Dublo Through Station or Island Platform will wish to add one or other of the two types of extensions that are made. They are uniform in shape, dimensions and style with the existing Through Station and Island Platform units, so that they can be used with them without any difficulty.

The arrangements for securing the extensions to the existing platforms are the same as those used between the platforms and the end ramps of the original equipment. Each meeting end of the components carries a short projecting stud, and is pierced as well with a small slot shaped like a keyhole. The studs engage the corresponding slots of the opposite component and when correctly lined up, platforms, extensions and ramps are locked together.

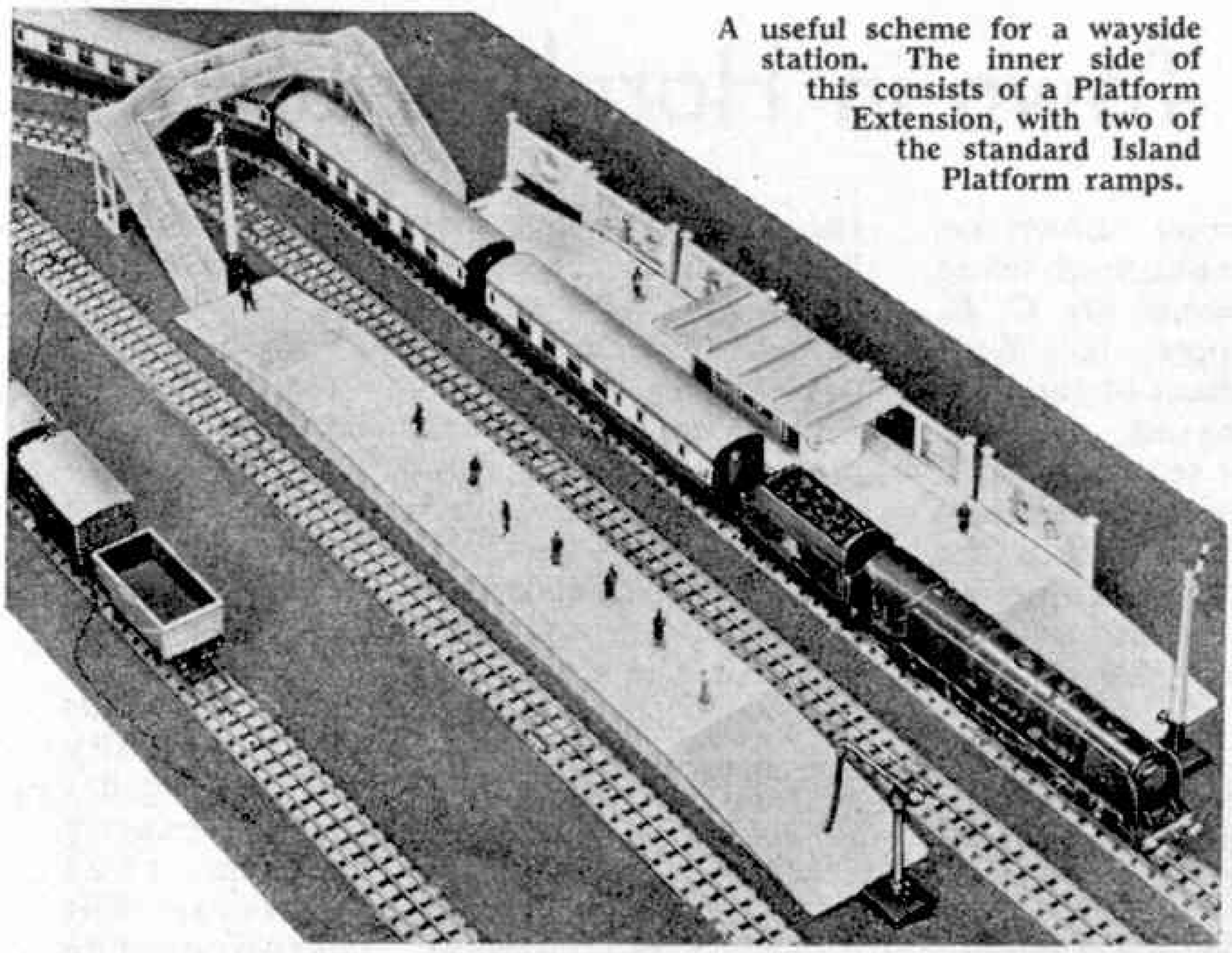
Any number of the extensions can be coupled together to build up a really good station. They can be added at either end of the existing Through Station or Island Platform, so that the finished assembly may have the station buildings or awning either in the centre or, as so often happens, offset towards one end of the whole station assembly.



Here is a Platform Extension added to the standard Island Platform. The increase of length is of course useful and gives a much more realistic appearance.

The unit of length employed corresponds with that of the centre pieces of the original Through Station and Island Platform and is the same as that of a standard Straight Rail. So it is easy for the Hornby-Dublo Engineer to work out exactly what space he requires for his extended platforms, or how much track will be needed to run alongside such extensions.

With these new parts added to the System, there will no longer be any need for trains to draw up twice at the platform in order to complete their passenger business, nor will the engine and perhaps part of the leading coach have to draw up clear of the platform end. A long platform always looks good, if you have sufficient space for it, and with the greater platform area now available more miniature figures can be brought in to give the right busy air to your stations.



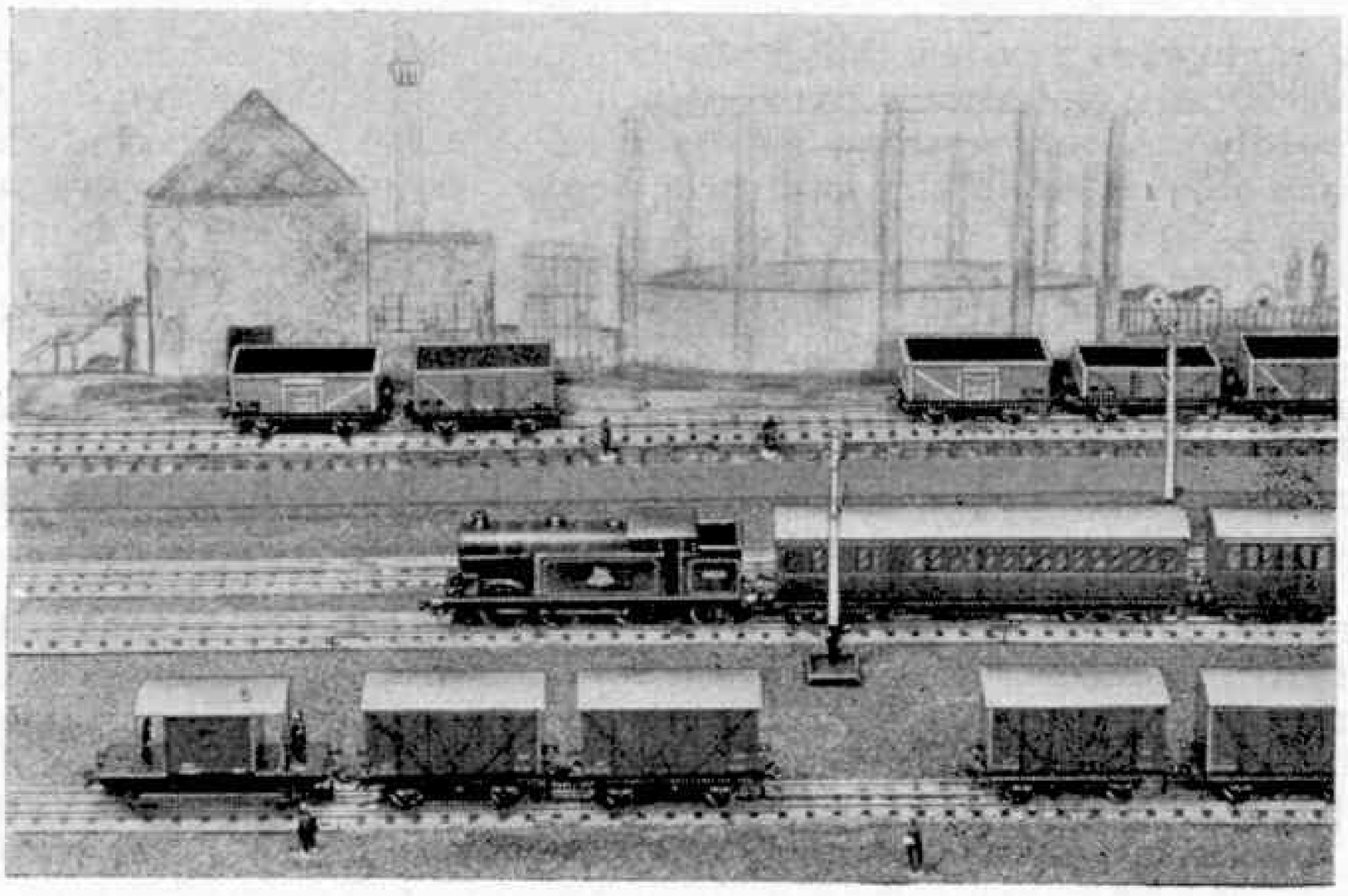
A useful scheme for a wayside station. The inner side of this consists of a Platform Extension, with two of the standard Island Platform ramps.

The Platform Extension intended for use with the Through Station is of course fitted with a back wall in the same style as that already provided on the Station components. This gives a uniform appearance to the whole thing that is very pleasing. Possibly some of you may wish to arrange a bay platform as part of the Through Station set-up. Perhaps a branch line train will stand there ready to exchange passengers with the main line train that calls at the opposite face. There is no difficulty about this. Instead of using the Platform Extension with the wall, you simply add the Island Platform type of extension to the Through Station main section and of course you finish off the end of the platform with the type of ramp used for the Island Platform. This is quite a nice variation that I am sure many of you will find useful.

Another scheme for a simple station layout is shown in the upper illustration on this page. The Island Platform with its standard ramps forms one side of the station, but the platform here is not used as an Island. The side away from the railway is built up by a series of Station Hoardings. The other platform consists of one of the extension pieces, and it is finished off at the ends with ramps of the type used for the Island Platform. The two sides of the simple station thus formed are of course connected by a standard Footbridge.

Similarly, a single Platform Extension and one ramp only would make quite a good "bank" for goods traffic. I expect that many of you will devise all sorts of interesting station schemes once you obtain some of the new extensions. If so, don't forget to write and tell me about them.

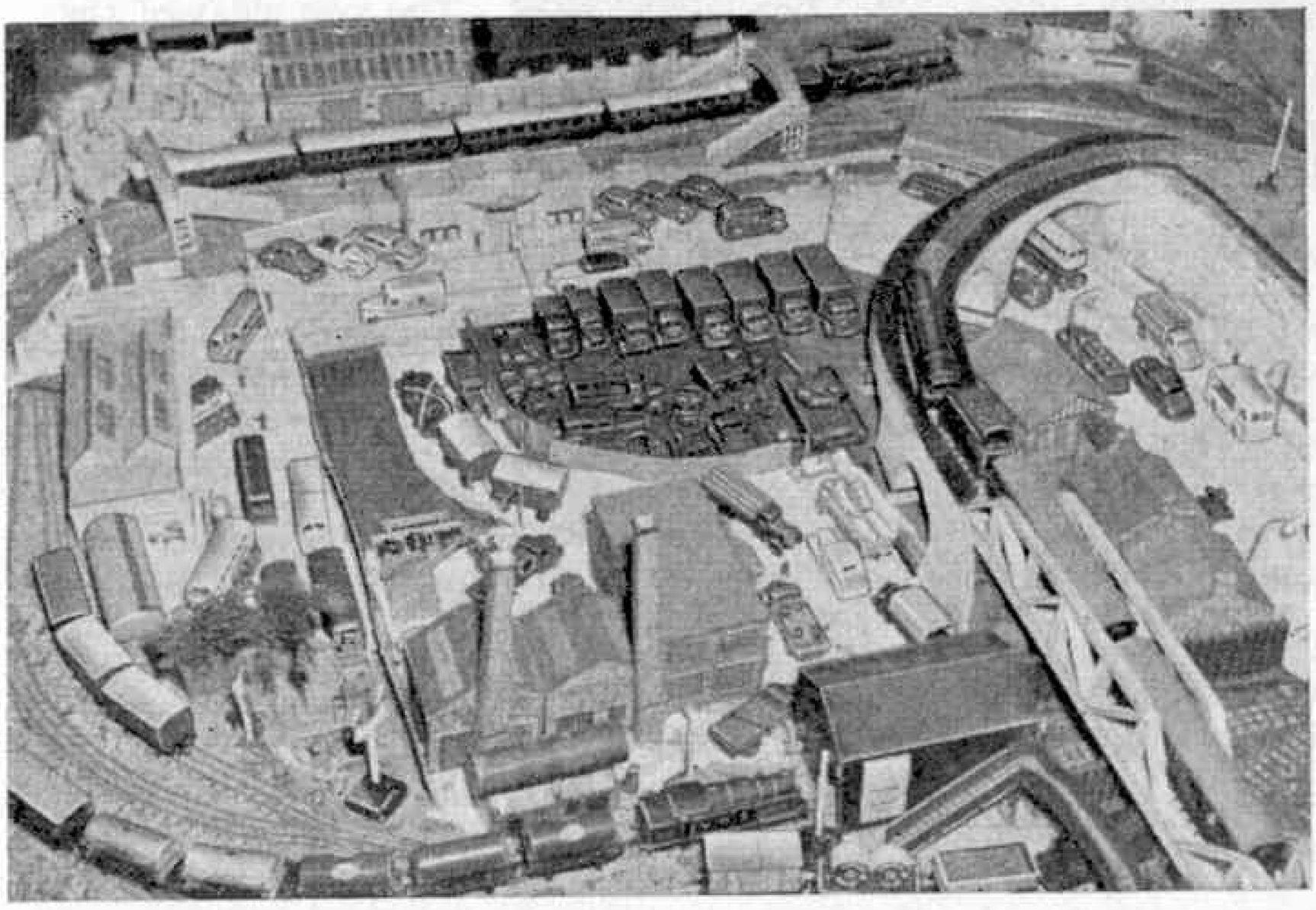
There are two new Tank Wagons that are newcomers to the range of Hornby-Dublo rolling stock. These will add to the variety as their liveries are smart and distinctive. The first represents a Vacuum Oil Company Tank Wagon and is appropriately finished in red with the Mobilgas motif. The other tank is yellow and bears the words *Shell Lubricating Oil.*



This picture shows an interesting variation of the usual background scene. The various gas works buildings and the gas holder explain the presence of the Wagons on the elevated road in the background.

Going to Town in Hornby-Dublo

THE Hornby-Dublo system shown on this page has the advantage of being a permanent one. So its owner, Mr. C. R. Johnson, of West Hartlepool, has been able to build up a busy system of railway, road and town. The layout occupies practically the whole of the space afforded by a small room. Very wisely the system has been planned in order to leave the space where the door opens completely free. The railway is therefore slightly irregular in shape. But this is no disadvantage, as a system that is absolutely symmetrical is not always too convincing.



An aerial view of the Hornby - Dublo railway and township of Mr. C. R. Johnson, West Hartlepool.

Broadly, the layout may be described as boot-shaped, or in the form of a very broad "L." The railway itself is designed so that the maximum number of trains can be run in a realistic manner. There are three main running tracks, one of which is at a higher level than the others and all are connected so that trains can be run from each to the others as desired. Each track is independent, electrically, of the others, and a very complete and neatly arranged control panel looks after this part of the job.

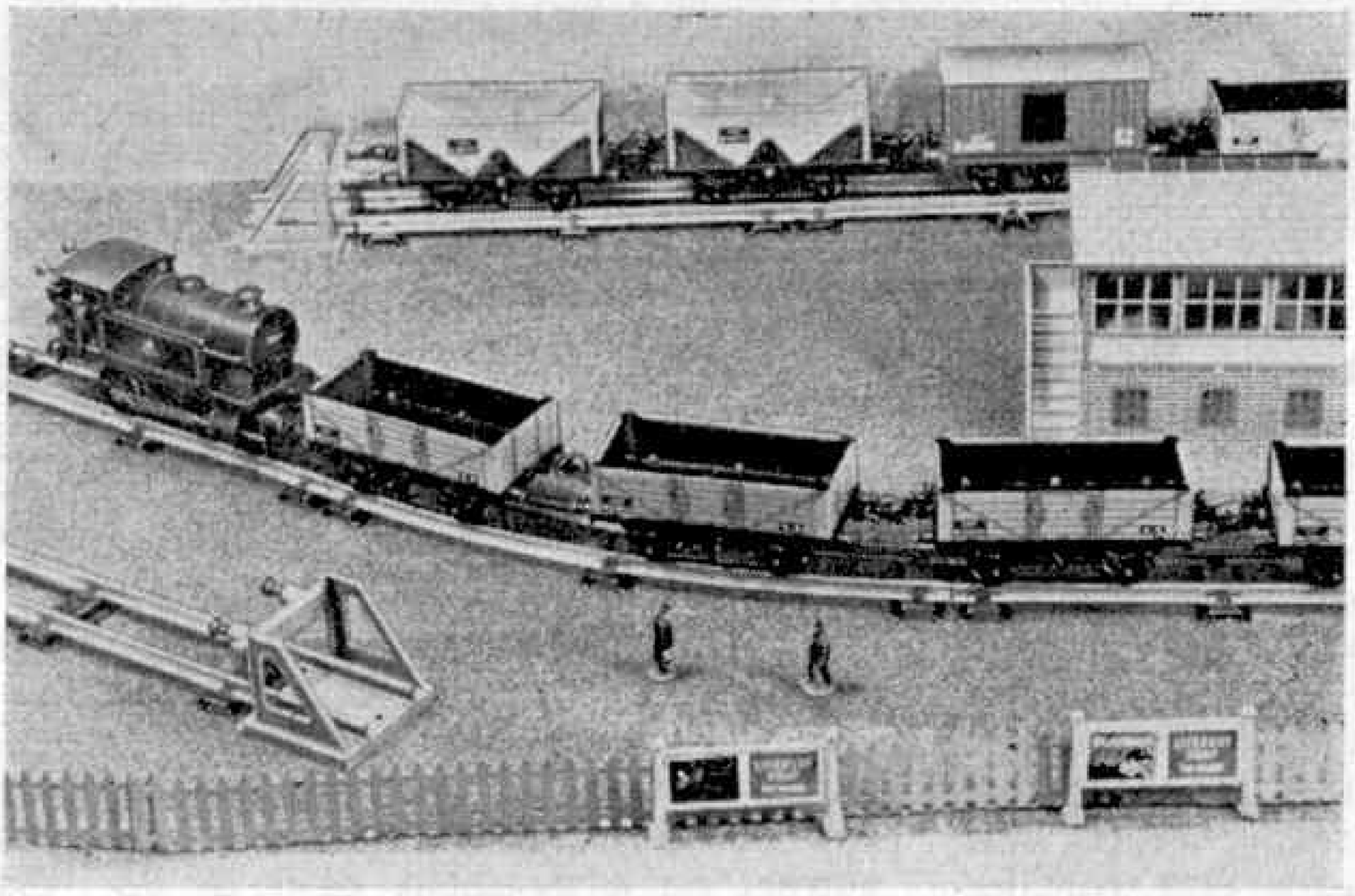
In the background of the picture is the main station, serving the through main lines at the lower level. It is readily identified by the two footbridges, one at each end of the two platforms, and the dark building beyond it is the engine shed. An aid to smart operation on the lower tracks is the presence of two loop lines that can be occupied by trains already made up. The Points controlling the loops are electrically-operated, and the loops of course form separate electrical sections. As soon as the main line is clear, one train or the other can be run out to make its journey, and then just as easily returned to make way for the next train in due course.

The various trains usually keep to regular routes, exactly as on real railways. For instance, the train of Tank Wagons seen in the foreground of the illustration usually follows the inner main track. There is in addition a timber train, which serves a yard devoted to the storage of pit props, and a complete train of vans for perishable cargo is always ready for action. Passenger trains of four or five Coaches run regularly on upper and lower levels, and the different duties are exchanged from time to time between a *Duchess of Montrose* and two older 4–6–2s.

A considerable amount of building and scenic work has been necessary in the development of the complete system, and good use has been made of ordinary builders' plaster in the formation of earthworks here and there. The miniature township is rather busy and closely packed, and Dinky Toys traffic on the main road is very heavy. An up-to-date development is a Royal Armoured Corps Depot, almost in the centre of the layout.

Hornby Trains and Dinky Toys

IN the lower picture here we have a keen Hornby railway owner from New Zealand, Sheldon Brown, whom we met once before in these pages, in March last year. Sheldon is doing something that a lot of you do—using his Dinky Toys with his Hornby Trains. Although this is an obvious and popular practice, it is surprising how few good photographs of such "combined operations" are received from readers. We get many good pictures showing Hornby Trains or Dinky Toys themselves, or both, set out in an attractive manner, but without anyone actually working them.



Two of the yard staff—Dinky Toys Railwaymen—are watching a train of empty wagons leaving the yard on this Hornby railway.

Prominent in the picture is the Elevator Loader—a Supertoy actually, No. 964—which is conveying the load from a road vehicle to a railway wagon in the siding at *Timaru* station on the layout. The Fork Lift Truck, No. 401, also is used for loading purposes and there is, too, another particularly interesting Supertoy, the Pullmore Car Transporter, No. 964. This is backed up to a railway vehicle so that the cars can be transhipped from one to the other.

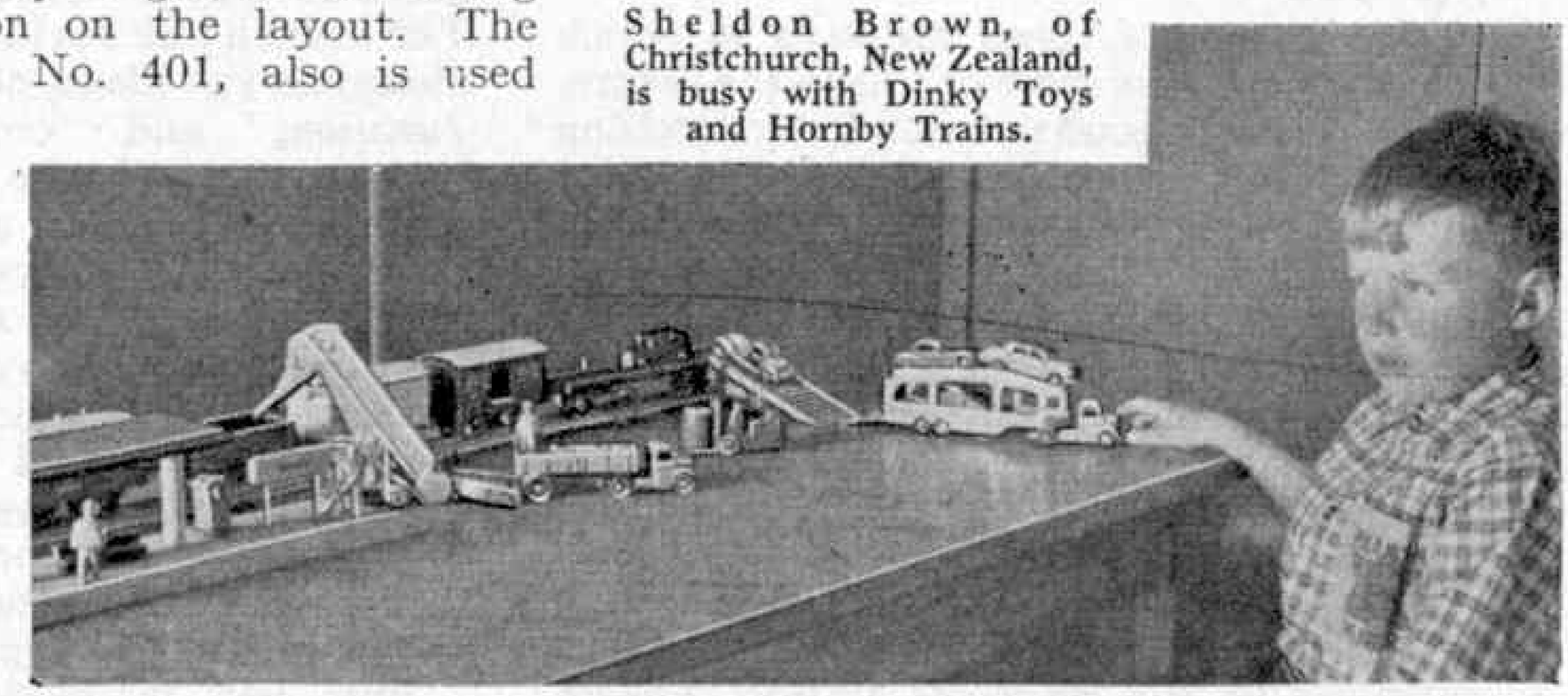
Many other Supertoys, or Dinky Toys to the larger scales, can be used very successfully in conjunction with Hornby Gauge 0 trains. The Goods Yard Crane, No. 973, is an obvious suggestion, and the Coles Mobile Crane, No. 971, will be found very useful indeed for loading and unloading and for the movement of goods in the yard.

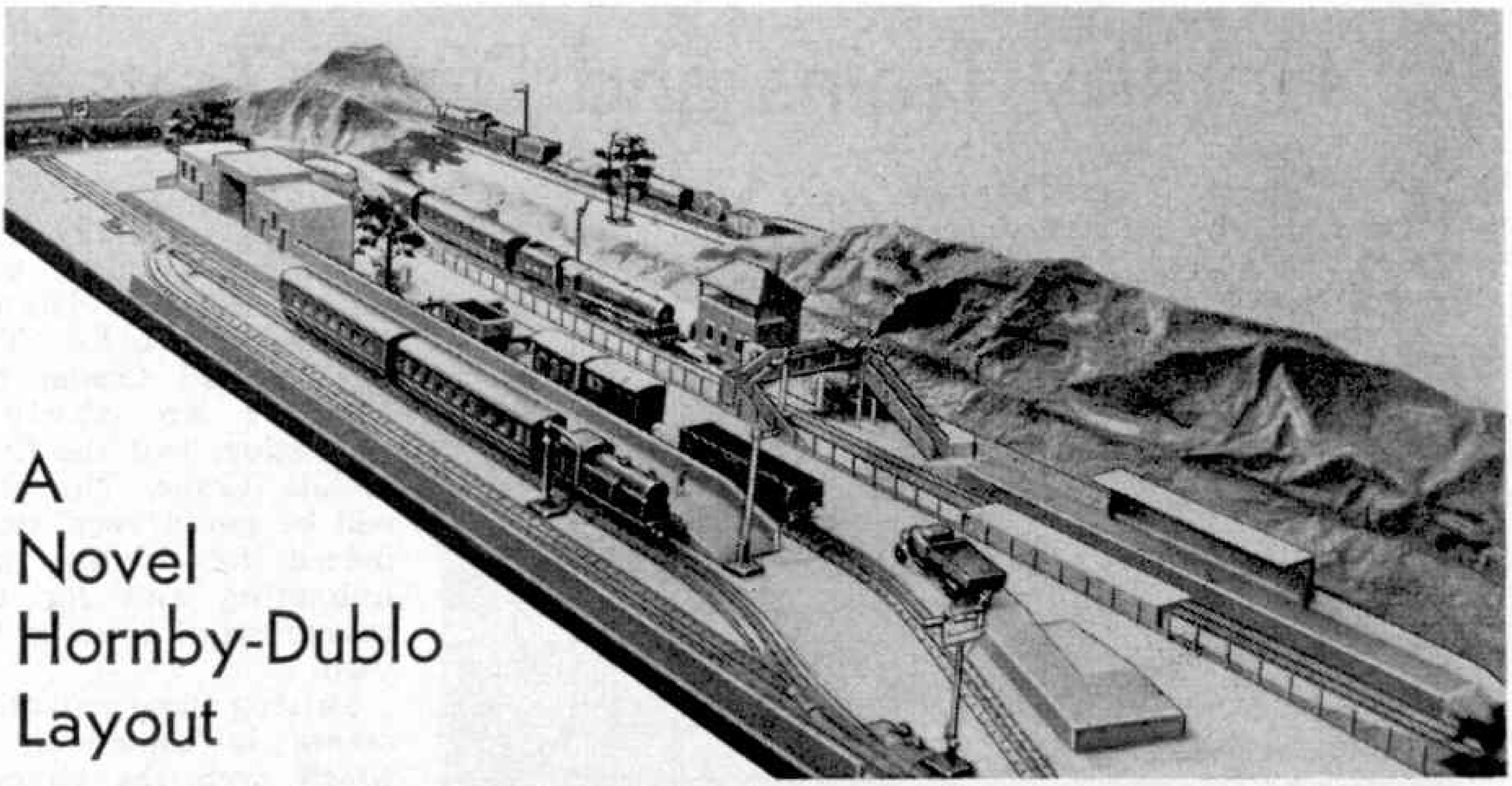
Driving these miniature cranes is something at which even the younger enthusiasts can develop considerable skill, and it is fascinating to make the Crane itself do as much of the work as possible. For instance the operator should try to get the Crane hook engaged with the miniature rope or sling that may be attached to the load for lifting, without his having to handle it at all. This takes doing sometimes, but it is well worth trying.

The larger lorries and wagons of the Dinky Toys range also are admirably suited to Gauge 0 purposes. Some of them of course are more adapted to actual "play" than others. For instance, those with working doors or drop tail-boards are just right for goods yard operations.

Another purpose for which many Dinky Toys are very suitable is that of providing loads, especially for the well-known Hornby Flat Truck.

Sheldon Brown, of Christchurch, New Zealand, is busy with Dinky Toys and Hornby Trains.





A Novel Hornby-Dublo Layout

HORNBY-DUBLO layout specialists will no doubt be pleased to see the diagram of the layout appearing on these pages. Like the system that the Secretary described last month, this railway includes a continuous main line, but it has in addition branch and other tracks that make end-to-end working possible. In addition, a feature of special interest is that the railway is extensive enough to incorporate a gradient section, which adds considerably to the enjoyment of operations.

The railway has been developed by a keen Hornby-Dublo owner Mr. C. B. Westlake, whose home is at Camborne in Cornwall, but who at present is doing duty in H.M. Forces. It is laid on a special baseboard supported on trestles and occupies practically all the space, except the doorway, in a room 9 ft. 6 in. by 7 ft. 6 in.

Above is shown part of the layout of Mr. C. B. Westlake, Camborne, Cornwall, described on this and the following page. "Trefusis" station and yard are in the foreground, with the lower-level main tracks beyond.

This is one of those railways in which the operator lives more or less in the centre, which is a very good position for controlling the different movements on the line. To reach the operating "well", so to speak, he has to pop under a viaduct by the doorway, but this is not an unbearable inconvenience, especially when the advantages of a central control point are remembered.

Although the railway is continuous, it does not follow the usual rectangular plan, as the diagram makes quite clear. Starting at the bottom of the diagram we find ourselves at the principal station, known as *Vean Mine Junction*, which takes its name from a real, but disused, tin mine in the district. This station is the junction for the branch line that forms the outermost track up the left hand side and along the top of the diagram. It climbs up to a tunnel on a gradient of 1 in 35. Then, swinging through a complete half-circle, it crosses the continuous main line near *Redbrooke* on the latter to reach *Trefusis*, a high-level station with a single platform. For convenience and for scenic purposes *Trefusis* and *Redbrooke* are connected by road and there is a level crossing near the latter Station.

An interesting point about this railway is the way in which each station is completely self-contained. There are no loop lines or sidings that belong neither to one place or the other and this makes quite realistic traffic working readily possible. The branch line begins at a buffer stop road alongside the island platform at *Vean Mine Junction*, and crossover connections between it and the up main line, and between the latter and the down main, allow plenty of scope for traffic working. An engine from the shed can easily reach the branch and vice-versa, and the crossover connections are particularly useful for goods traffic in and out of the junction station, either for the main line or for the branch. Through running is possible too, if necessary, in either direction between the branch and the main line.

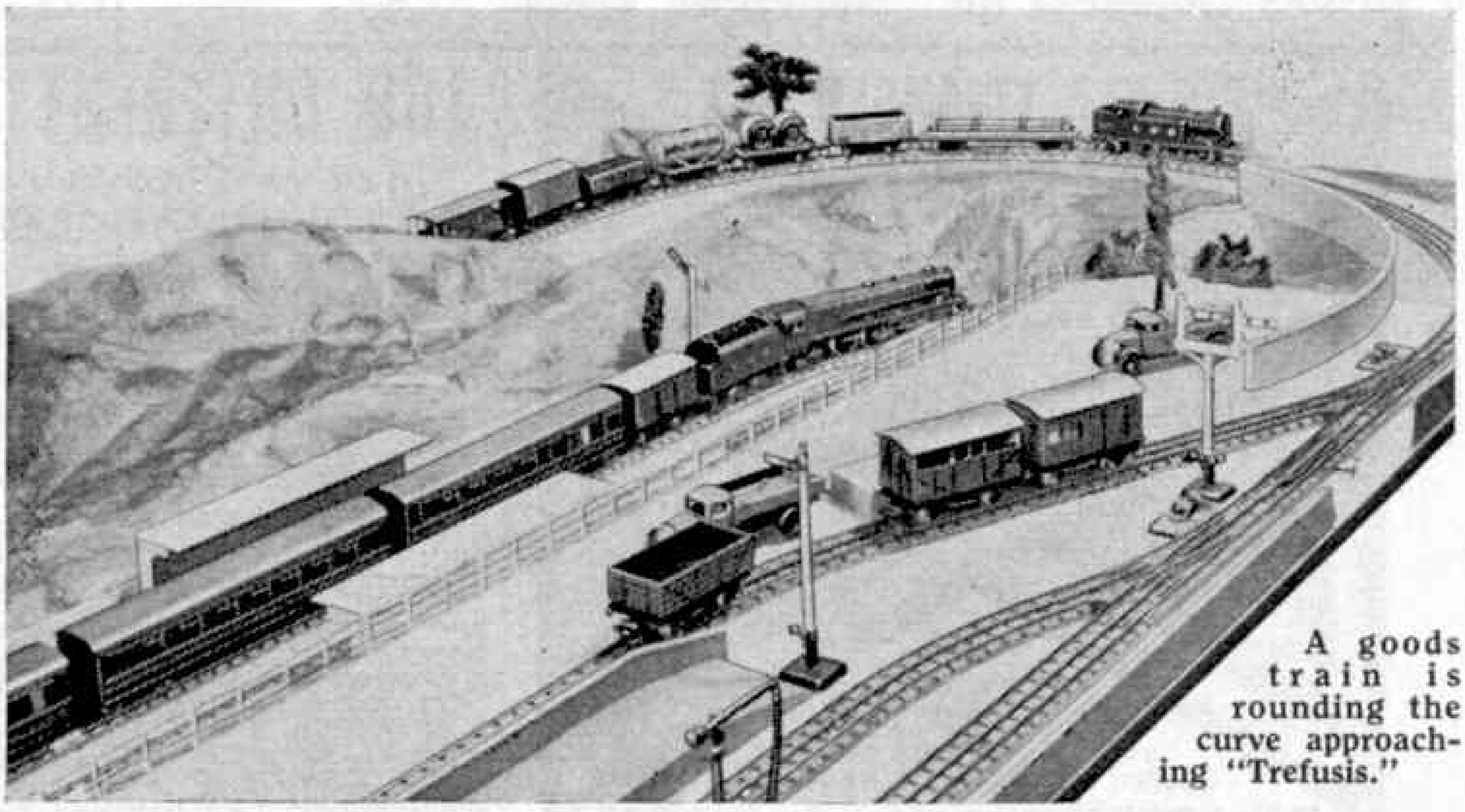
Full use is made of Hornby-Dublo

Uncoupling Rails, so that engines can readily be detached from their trains at suitable points and of course vehicles can readily be shunted when this type of working is necessary.

This makes it possible for a train to leave the junction station and make its way up the branch to *Trefusis* and run in alongside the platform there. While station business is going on the engine can set back slightly to uncouple, run forward and then come back round its train to re-couple at the other end.

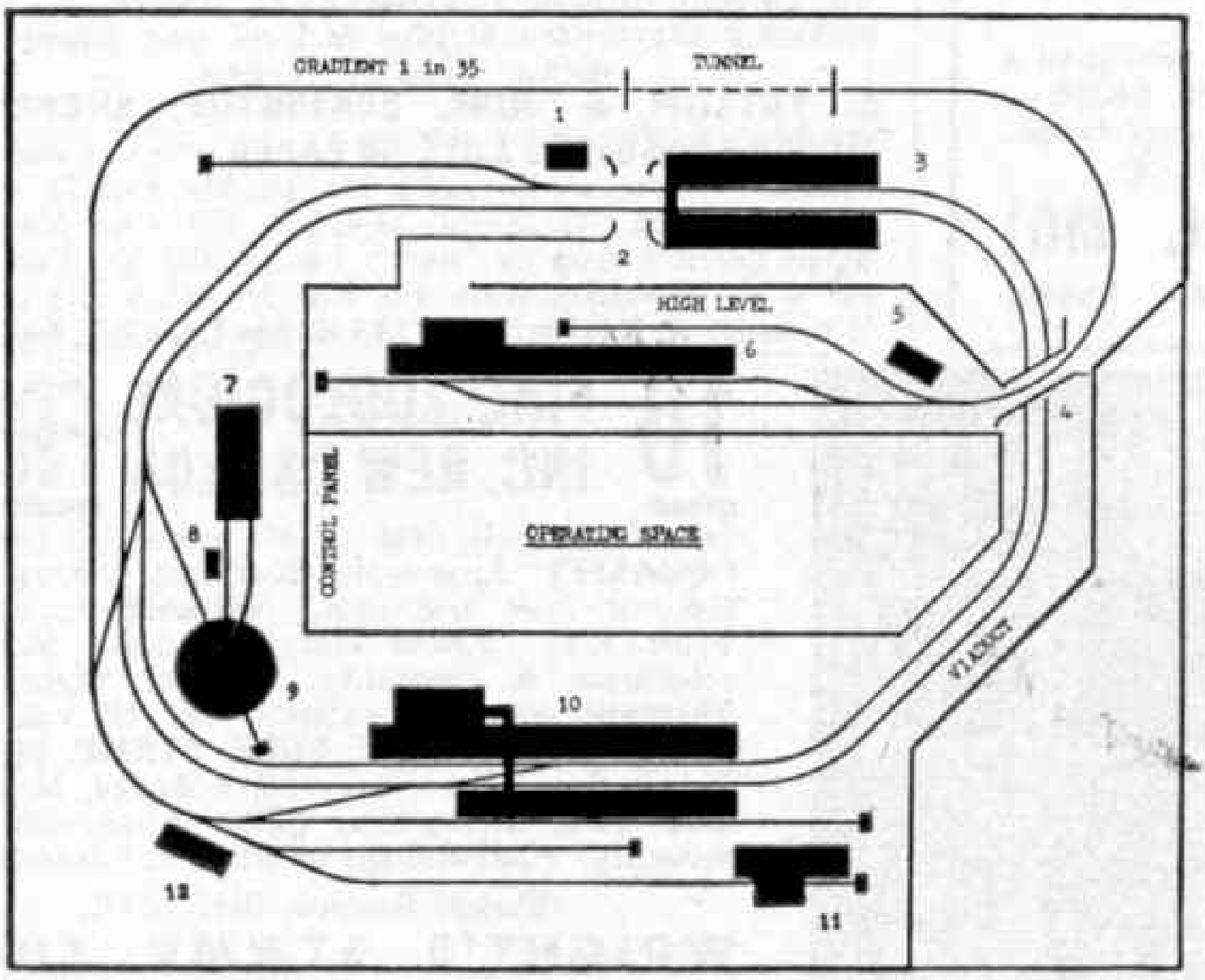
All is then ready for the return journey and similar running round is possible at the junction, although in this instance the branch train has to set back from the platform to stand in between the crossover roads before the engine can uncouple, and get round again. The train is then propelled into the platform to pick up traffic for the next trip. Thus, although running round arrangements are quite complete at both these terminals, the exact nature of the equipment is refreshingly different.

The diagram and the other illustrations give a pretty good idea of the general appearance of the railway, which is powered by three Hornby-Dublo Locomotives, one "Duchess" and two Tanks. At the moment five Corridor Coaches look after passenger traffic. The Tanks are limited to three-coach loads up the incline, but the "Duchess" is permitted to take four. Presumably there are limits for goods traffic too, although there is no mention of this in the notes from which this article has been prepared. It is quite evident that plenty of attention is given to goods traffic, including fast trains of fitted vans, for there are as many as 35 goods vehicles on the strength.



A goods train is rounding the curve approaching "Trefusis."

Control arrangements give completely independent working on the two main lines, each having its own supply and Controller. Special switching arrangements make it possible for either Controller to look after the branch track. In all there are 26 separate sections on the railway, the nerve centre of which is the control panel situated at one end of the operating space, close to the turntable and locomotive yard. Equipment here includes a shed and water tank in addition to the turntable, all of these of home construction.



Key to the numbers on the diagram: 1. Signal Cabin; 2. Level Crossing; 3. Redbrooke Station; 4. Bridge; 5. Signal Cabin; 6. Trefusis Station; 7. Engine Shed; 8. Water Tower; 9. Turntable; 10. "Vean Mine Junction"; 11. Goods Shed; 12. Junction Signal Cabin.

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Stamp Collectors' Corner

By F. E. Metcalfe

MORE ABOUT MALAYA

LAST month, in discussing a simplified collection of what are now the very popular Malayan stamps, we got as far as the interesting "B.M.A." set of Straits Settlements. I explained something about the different papers and shades—and the two dies—which go to make up this issue, and some might think that such a complicated set is not for collectors who do not know much about philately. But actually, while there is a lot about this B.M.A. issue, there is really nothing at all complicated. I do not know of any other group of stamps that is more suitable for illustrating some of the niceties of our hobby—you don't always wish to remain mere stickers-in of stamps you know nothing about, do you?

In our collection we now have the Straits Settlements set bearing the portrait of King George VI, and the same set overprinted B.M.A. (British Military Administration, for those who did not see last month's *Meccano Magazine*). Those are all that we will have of that political division. With them you will begin your collection, and even if you cannot complete both the overprinted and the unoverprinted don't worry; you will easily get enough to make a nice little showing.

And by the way, don't forget the Coronation set of 1937, and if you really feel like doing the thing in style, there are the postage due labels. There was a time when this class of stamps was not popular, but all that has changed, and nowadays postage dues are almost as much sought after as ordinary postal issues. Of course the finding of the watermark error, to which I have previously referred, has added to that popularity. But increased interest in the labels was well under way long before the watermark varieties were spotted.

If you do go in for the dues, while one is rather expensive—the 15c.—you will not be much out of pocket on the whole. It is probable that the real scarcity of some of them is not fully realized yet, and they have possibilities regarding increases in prices. You may not want to buy for profit, but you don't mind a little extra in the value of one's stamps once in a while!

For one interested in such things, shades and perforation varieties are to be found, and these are listed in the Commonwealth Catalogue.

Now having got our Straits Settlements all sorted out, we come to the sets for the various Malayan States. If we were to go in for all the stamps these have issued, we would certainly have something on our hands, but I am going to suggest that only the various sets of the KGVI–QEII period should be taken up. As these lines are being written, most of the stamps to which I will refer can be obtained at current rates. The definitive sets go up to $5, and that is perhaps a bit above the capacity of most of us, though if used stamps are being collected, and generally they are cheaper throughout the group, the higher values of Malacca, Penang, Singapore, etc., are not expensive. In fact, I saw an advertisement the other day in which the $5 values of the countries mentioned were being offered at half a crown each. And some of the others do not cost much more.

The first of the territories to be considered is Johore. In 1940 a handsome stamp was issued for this State, depicting the head of the Sultan. It can be obtained with two shades of border. And what is really a throw-back of a previous set was also issued in 1940. This was the 12c., a typographed stamp, which though only catalogued at a few shillings is getting more difficult to obtain. In 1949 the present set was brought out. It was typographed, like all the current sets of the Malayan States, and there are some grand shades to look for. As used copies are not scarce, many can be picked up from dealers' approval sheets for mere coppers.

But I must issue a word of warning about these stamps, one that applies equally to all current stamps for Malaya. If soaked in water, the colours of the reds and purples on the 5c., 10c., 25c., 35c., and $1 values are likely to run, and much as collectors like varieties, they certainly don't like those created in this way! When buying, it is good to remember this little point, and to remember it also when stamps are being washed off paper.

What I have said here mostly applies to the other Malayan States, for all have typographed sets which go up to $5. But while there is a similarity in the printing process used and in the general make up of the sets, all are intensely interesting, for there are so many good shades and plenty of postmarks to be found. And incidentally, although the various States have their own stamps, it would seem that those of one State can be used in another. In fact I have seen a parcel bearing stamps from six different States.

The perforations of these various States are unique. The first of the sets to appear was for Singapore, and the stamps were the normal perforation $13\frac{3}{4} \times 14$(C)—the C stands for comb perforation. That was in 1948. In 1949 several values came out in a new printing, and the teeth were so close together that there were no perforation gauges fine enough to measure the perforations. Later they were found to be actually $17\frac{1}{2} \times 18$. It was thought that this was merely a stop-gap job, but the sets for the other States appeared in the same fine perforation. The stamps separate easily, and without tearing.

The other sets run more or less on the same lines as that for Johore. It is not easy to find used copies of States like Perlis, which has its own set of definitive stamps for the first time, and Trengannu. But as these stamps can be used in other territories, they are not quite as scarce as they would otherwise have been.

There now we have our collection all mapped out—the two definitive sets for Straits Settlements, with the 1937 Coronation set and the postage dues if you want to include them, the definitive sets issued from 1948 onwards for the various States, again with the Silver Wedding, U.P.U. and 1953 issues if you want these also. Whether you include the latter commemoratives or not, you will be able to gather an interesting collection together. One that will not cost too much, but will show that you really know something about stamps.

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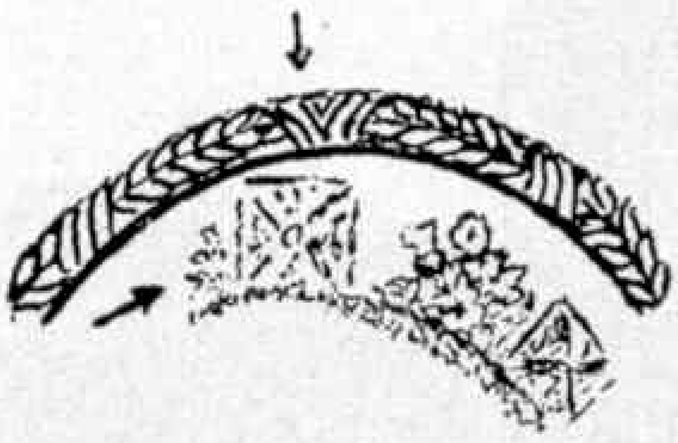
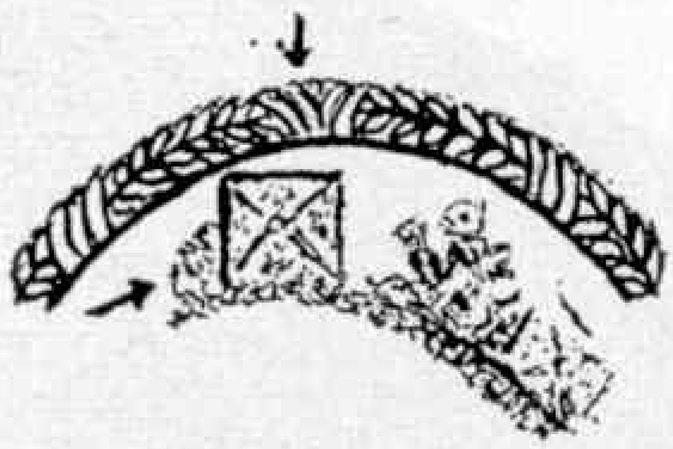
Stamp Gossip

GREAT BRITAIN

WHY not start off our comments this month with our own stamps, particularly as one of them seems to be worrying a number of readers. This is the current 2½d. Queen Elizabeth portrait stamp. If you will look at copies of this stamp, you will notice that on some of them the line at the top of the cross only goes about half way along; on others it goes the whole length. The cross I am referring to is the one in the centre front of the diadem worn by Queen Elizabeth. This is not just an accident, for the stamps with the half line come from sheets, and those with the full line from booklets.





Now here you can mystify your friends. Get them to take a 2½d. stamp from a booklet and one from a sheet. They will look exactly the same to them, but you can tell which is which by the state of the line at the top of the cross. Why the two states exist I do not know, but they do. Some collectors thought that they had discovered varieties. They have, of course, but nothing rare.

THREE CENTURIES

On 10th May Jamaica issued a set of four stamps to commemorate the three hundredth anniversary as a British territory, and collectors were glad to see that the set was a great improvement on the somewhat lurid pair of commemorative stamps issued in 1952 to mark the First Caribbean Scout Jamboree. There were many criticisms of the latter set, but the latest stamps, while rather lacking in originality, are quite nice and are proving very popular.

Three centuries is a long time. Whilst Jamaica is going through a rather difficult period, I think it is fair to say its people do not regret the association with us. At any rate, their products would not be easy to market if it were not for the preferences which Britain accords. Moreover, many Jamaicans are coming over to this country for work.

POSTAL STATIONERY

Within the last month or two more than one reader has asked what is postal stationery, and what connection has it with stamp collecting.

If you ever see a very old collection, it is almost certain that among the ordinary postage stamps, particularly those of Great Britain, cut-outs also will be found. These are stamps that are impressed on postcards or envelopes. When stamps were relatively scarce, compared with today, enthusiasts included these in their collections. Later, with plenty of adhesive postage stamps to go at, the cut-outs fell out of fashion. But recently they seem to be coming into favour a little, not just the stamps, but the entire envelope or postcard.

These are what are known as postal stationery. Both mint and used are collected, and in the case of the latter particular notice is taken of any special postmarks there may be.

On 6th April a new postcard was issued here in Britain, and the stamp on this is illustrated. For those who want to write up their collections, it can be mentioned that the designer of the stamp was Mr. John Farleigh, C.B.E., R.E., who did the murals for the Tea Centres on two New Zealand liners, and also the illustrations for many books. De La Rue were the engravers. The same design was used for the 2½d. stamp on the envelope released in May. I do not think that postal stationery will ever interest more than a few collectors, but some of the cancellations to be found on cards and envelopes are quite interesting, to specialists at least.

AMERIGO

I seem to have written a lot about our own stamps this month, but after all they are of most importance to us, and it is not often that anything new happens which gives us a chance to discuss them. Anyhow, now we'll slip over to Italy, a country always in the philatelic news, for it issues new stamps every few months. But not all of them are as interesting as the pair issued on 31st December to commemorate the fifth centenary of the birth of the explorer Amerigo Vespucci.

What is there special about the man honoured? Only that his Christian name was adapted to the New World, and not that of Columbus, its discoverer. Both Cabot and Vespucci reached the American continent itself before Columbus, and no doubt the Vikings did so long before any of them. But the stories that Vespucci told, true and untrue, brought him the distinction of having his name associated with that continent.

BIRDS AND THINGS

As most collectors know, collections based on themes—hence that rather horrid synthetic word thematic, to describe them—are becoming more popular all the time, and as satisfactory alternatives to a general collection, which is beyond anybody's capacity nowadays, with so many stamps existing, I am all for them. Speaking to a young collector some time ago, he surprised me by saying that he would go in for

(*Continued on page 400*)

Competitions! Open To All Readers

Prize-winning entries in M.M. competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

What Named Trains are These?

THE summer rail traffic is now in full swing, and most of our railway-minded readers will be out pursuing their hobby. It is a real thrill for the enthusiast to see a named train hurtling by. Our competition this month deals solely with well-known named expresses, at home and overseas.

Below is a list of ten clues, each of which has an association with the name of a particular train. For instance, the first clue, *St. Patrick's Emblem*, naturally suggests *The Shamrock*, which runs between Liverpool (Lime Street) and London (Euston). This incidentally is the route also of *The Merseyside Express* seen in the official B.R. photograph reproduced on this page. We are sure that readers will find solving the remainder a pleasant pastime.

Here then is the list of clues:—

1. St. Patrick's emblem.
2. Glittering missile.
3. Largest of forty-eight; across the Atlantic, this one.
4. Sails through the darkness.
5. No longer popular as fuel in cities.
6. Roman or Briton?
7. Occasional celestial body.
8. Might have been named after Trevithick.
9. Cream and Cider.
10. From Norway, Sweden or Denmark?

In your solution the titles of the trains should be given in the same order as their appropriate clues. The name of the railway system or the Region of British Railways, and the places between which each train runs also should be stated. Competitors should use only one side of the paper for their answers, and on the back of each sheet should add their name, address and age. It is surprising how often these necessary details are omitted, causing the entries concerned to be disqualified.

The competition will be divided into two sections, for Home and Overseas readers, and in each section we will award prizes of 21/–, 15/– and 10/6d. There will also be a number of Consolation prizes for deserving efforts. When awarding prizes the judges will take originality and neatness of presentation into account.

Envelopes containing entries should be addressed: *July Named Trains Contest, Meccano Magazine, Binns Road, Liverpool 13.* The closing date in the Home Section is 31st August, and in the Overseas Section, 30th November.

Competition Results and Solutions

HOME

FEBRUARY 1955 SOCCER CONTEST

1st Prize: D. Stubbs, Stoke-on-Trent. 2nd Prize: A. Wiltshire, Devizes. 3rd Prize: G. T. Owen, Cosham. Consolation Prizes: A. Mowforth, Newcastle-on-Tyne 3; B. W. Hayle, Birmingham; S. Bean, Sheffield.

FEBRUARY 1955 WAGON CONTEST

1st Prize: I. Lamb, Edinburgh 11. 2nd Prize: L. T. Shorrock, Wrea Green. 3rd Prize: E. Potter, Bolton. Consolation Prizes: R. E. Harding, King's Lynn; W. Shelton, Gainsborough; S. C. Williams, Rhyl.

MARCH 1955 CROSSWORD CONTEST

1st Prize: J. C. Ellis, Benenden. 2nd Prize: J. E. Story, Sunningdale. 3rd Prize: J. S. Roberts, Saffron Walden. Consolation Prizes: B. Spencer, Houghton-on-the-Hill; P. J. Jacobs, Bristol 4; P. Hart, Chester; G. C. Fairweather, Barking; A. G. Thom, Hamilton.

MARCH 1955 DRAWING CONTEST

1st Prize, Section A: M. R. Burnett, Alderney, C.I. Section B: P. W. Walters, Cambridge. 2nd Prize, Section A: M. T. Furniss, Sheffield 8. Section B: E. C. Harrison, Llanfair. 3rd Prize, Section A: N. Guppy, York. Section B: F. J. Alexander, Glasgow C.3. Consolation Prizes: I. Scott, Edinburgh 7; P. J. Reading, Coventry; R. Shields, London N.W.11; R. Cooper, Potters Bar; A. C. Hanna, Romford; D. Walker, Worcester; M. Pearson, Saxmundham.

OVERSEAS

OCTOBER 1954 LOCOMOTIVE CONTEST

1st Prize: S. Doyle, Dublin, Eire. 2nd Prize: S. Nanavati, Allahabad, India. 3rd Prize: J. A. Gomes, Bombay 20, India. Consolation Prizes: P. J. Watts, Adelaide, Australia; S. Rochfield, Winnipeg, Canada; P. O. Wilkins, New York, U.S.A.

NOVEMBER 1954 BEAUTY SPOTS CONTEST

1st Prize, Section A: R. Connolly, Toronto, Ontario. Section B: J. K. Ashley, Dublin, Eire. 2nd Prize, Section A: J. Kerly, Perth, Australia. Section B: R. Hepburn, Gisborne, N. Zealand. 3rd Prize, Section A: F. Buckley, Cork, Eire. Section B: T. Dobson, Idaho, U.S.A. Consolation Prizes: M. C. Fitzgerald, Cork, Eire; A. J. de C. A. Arriaga, Peso da Regua, Portugal; R. F. Lewis, Johannesburg, S. Africa; S. Vincent, Dublin, Eire; P. Burrough, Kuala Lumpur, Malaya.

NOVEMBER 1954 FIGUREWORD CONTEST

1st Prize: H. A. Kimber, Poona 1, India. 2nd Prize: D. Hemphill, Dargaville, N. Zealand. 3rd Prize: J. Kearey, Blakehurst, N.S.W. Australia. Consolation Prizes: M. A. G. Moura, Porto, Portugal; D. Hughes, Ramarama, N. Zealand; A. Lopez, Arusha, Tanganyika Territory.

NOVEMBER 1954 MOTOR DRAWING CONTEST

1st Prize: A. B. Wilson, Winnipeg, Canada. 2nd Prize: S. G. Siong, Singapore 9. 3rd Prize: S. Wailsham, Melbourne, Australia. Consolation Prizes: P. A. V. Hall, Plumtree, Southern Rhodesia; P. O'Reilly, Dublin, Eire; H. O. Morley, Bombay, India.

DECEMBER 1954 PAINTING CONTEST

1st Prize, Section A: P. W. Oakley, Melbourne, Australia. Section B: S. Lawani, Keffi, Northern Nigeria. 2nd Prize, Section A: A. Walters, Pretoria, S. Africa. Section B: M. H. Comrie, Durban, S. Africa. 3rd Prize, Section A: B. R. Kennedy, New York, U.S.A. Section B: T. G. Broadley, Adelaide, Australia. Consolation Prizes: S. Potters, Johannesburg, S. Africa; C. F. Crawley, Toronto, Canada; I. Beattie, Cork, Eire; R. P. Wheldon, Wellington, N. Zealand; H. Sanders, Dublin, Eire; W. Hinds, Perth, Australia.

DECEMBER 1954 HIDDEN NAMES CONTEST

1st Prize: D. F. Hegarty, Dublin, Eire. 2nd Prize: I. Shirley, Boston, U.S.A. 3rd Prize: T. B. Jeffries, Capetown, S. Africa. Consolation Prizes: P. Macnamara, Waterford, Eire; L. Murphy, Athens, Greece; N. Pollock, Bombay, India.

SOLUTIONS

DECEMBER 1954 HIDDEN NAMES CONTEST

Aircraft: Airspeed *Ambassador*, Boulton Paul *Balliol*, Chance Vought (U.S.A.) *Corsair*, De Havilland *Heron*, Avro *Lincoln*, Martin (U.S.A.) *Marlin*, Hunting Percival *Prince*, North American (U.S.A.) *Sabre*, North American (U.S.A.) *Tornado*. **Motor Cars:** Sunbeam Talbot *Alpine*, Ford *Consul*, Austin *Countryman*, Riley *Pathfinder*, Ford *Prefect*, Austin *Princess*, Triumph *Renown*, Armstrong-Siddeley *Sapphire*, Humber *Snipe*. **Motor Lorries:** Thornycroft *Antar*, Karrier *Bantam*, Dennis *Lancet*, A.E.C., Crossley, or Maudslay *Matador*, Leyland *Octopus*, Dennis *Pax*, A.E.C., Crossley, or Maudslay *Regal*, Guy *Wolf*.

JANUARY 1955 COVER VOTING CONTEST

1. September. 2. October. 3. November. 4. December. 5. April. 6. March. 7. February. 8. May. 9. August. 10. June. 11. January. 12. July.

JANUARY 1955 LOCOMOTIVE CONTEST

1. Sheffield Wednesday, 61661, B17/4, 4–6–0, E. and N.E. 2. Golden Eagle, 60023, A4, 4–6–2, E. and N.E. 3. Charterhouse, 30903, V, 4–4–0, S.R. 4. Eddystone, 34028, West Country, 4–6–2, S.R. 5. Colorado, 60094, A3, 4–6–2, E. and N.E. 6. Sir Walter Scott, 60143, A1, 4–6–2, Sc. R. 7. Waverley, 60509, A2/1, 4–6–2, Sc. R. 8. Rugby, 30920, V, 4–4–0, S.R. 9. Lightning, 70019, 7MT, 4–6–2, B.R. 10. Templecombe, 34098, West Country, 4–6–2, S.R. 11. Wellington, 5075, Castle, 4–6–0, W.R., or Wellington, 30902, V, 4–4–0, S.R. 12. Perseverance, 45731, 6P, 4–6–0, L.M.R.

March 1955 Crossword Solution.

The "Southern Cross"—(*Continued from page 347*)

Yarrow type, designed for a working pressure of 500 lb. per sq. in. and a controlled superheat temperature of 800 deg. F. Boiler oil is the fuel, and air for its burning is heated by steam bled from the turbines, and not as is usual by exhaust gases. Diesel-driven generators provide electric power, and all auxiliary gear is electrically driven.

The vessel is fitted with two Denny Brown stabilisers, which reduce rolling in bad weather to a minimum and so contribute greatly to the comfort of passengers. Each fin is 12 ft. long and 6 ft. 6 in. in breadth. There is also a Marconi sound reproducing system, one of the largest fitted on board ship. It feeds a network of 200 loud-speakers that provide both passengers and crew with news, entertainment and announcements or orders. News and other programmes of interest are recorded on tape if they are received at times that are not convenient for immediate use, and are then reproduced as required.

Watch That Hedgehog—(*Continued from page 365*)

dozen. A few people kept them in kitchens, bakehouses and gardens, where they proved adept at killing black beetles, cockroaches and other pests. More often they were eaten. Gipsies prepare hedgehog in a layer of clay and suspend over the fire with a roasting jack. Served with sage and onion, roast hedgehog is counted by some cooks as a sound substitute for chicken.

Yet so attractive are these lovable and curious creatures, so useful are they to the gardener and farmer, that it is hard to understand the mentality of those who would slaughter them. A live hedgehog in the garden is far more attractive than a dead one in the oven, for a roast hedgehog can teach us nothing about itself and its habits. But one can never be bored while this curious creature ambles about the garden, as Eyre and Spottiswoode wander through mine, to reveal something of the way of life of one of the most strange and secretive of British mammals.

Stamp Gossip—(*Continued from page 397*)

stamps depicting birds if there were enough of such stamps to keep him occupied. It was his turn to be surprised when I told him that there were actually over three thousand stamps showing an eagle, and I was in for yet another surprise when I read the other day that there are also over a thousand with the mighty condor as the theme.

What wonderful birds these latter are. I have seen them up in the Andes, just as stationary specks up in the sky, yet a mouse could not move below without their seeing it. I would love a complete collection containing all those "Condor" stamps, but I am afraid that I lack both the necessary time and patience ever to get such a collection together. Are there any readers who would like to have a go? They will need plenty of enterprise, but well written up, such a collection would be a gem.

"TRAINAME-BOARDS"

Under the title *Trainame-Boards* there is now available a series of different train titles that will appeal particularly to the owners of Hornby-Dublo and other 00 Gauge systems. The various titles are printed on a sheet of self-adhesive material mounted on a backing sheet. The required title has to be cut to size and peeled off the backing sheet, after which it can be attached directly to the coach roof, or just above the windows, according to the type of coach.

This is quite easy, and if the board is not placed just right first time, it can be peeled off the coach and put back again. The boards can be removed from the vehicles when not required and stored temporarily on the backing sheet.

A good selection of titles is already available and further additions are planned. Full details can be obtained from the manufacturers "Trainame-Boards," 36 Bowman Lane, Leeds 10.

The search for Victorian pillar boxes that began on the appearance of the April "M.M." brought this hexagonal specimen. It is in Bath and the photograph was sent by P. R. Forsey.

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From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

REFLOATING A TRAWLER

The accompanying illustration shows a French trawler that ran aground at Waxham, Norfolk, during a snowstorm in February last. The crew were taken off by breeches buoy, but later some returned with members of the local life-boat crew to see about refloating. While they were inspecting her, the tide came in and they had to be rescued a second time!

Some days later the vessel heeled right over till her masts were almost horizontal, and she lay like this for over a month while salvage operations progressed. The work was carried out by a Dutch firm. She was made watertight, even her funnel being battened down, and tons of sand were then pumped away from her. Ten days afterwards her list had been reduced to 45 deg., a wonderful feat. On the high tide of the following day this list was further reduced to 10–15. At which stage I saw her and took the accompanying photograph.

She floated that night on high tide, and then grounded on an outer sandbank. But the tugs got her free and she moved out to sea to be towed to Great Yarmouth. For a few days she remained in the harbour at Yarmouth, still with a slight list of 12 deg., on account of sand in the port side of her double bottom. Then she was moved into dry dock for temporary repairs. G. E. Smith (Sutton).

This photograph of the stranded French trawler St. Pierre Eglise at Waxham, Norfolk, was taken by G. E. Smith, Sutton, as she was being righted after heeling over.

CALSHOT SPIT LIGHT VESSEL

The highlight of a *Southampton Special* B.R. excursion I took part in was a trip down Southampton Water and back by steamer. We had fine close-up views of the shipping and went so near to the giant *Queen Mary* that she towered high above us.

The turning point of this brief voyage was the Calshot Spit Lightship, and we rounded the ship closely enough to see the cheery faces of the men on board as they waved to us and we gave them an answering cheer. I was thus able to take the close-up photograph of the lightship seen on this page. Behind the ship, in the distance, the shores of the Isle of Wight can be seen. Most lightships, or, as they are more properly called, light vessels, are anchored several miles off shore and it is not often one has the chance of so near a view.

There are 33 light vessels round the English coast. They are painted red and have their names in large white letters on the side. The mast, with its outstanding lamp platform, also serves by its characteristic shape to make the vessel more easily distinguished in conditions of low visibility. The latest light vessels are equipped with radio and radio direction transmitting equipment.

English light vessels are not self-propelling, as are those of some other countries. They are towed to position by tugs or lighthouse tenders, and anchored above the shoals they guard. They are maintained by Trinity House and are manned by Trinity House men, who maintain a constant watch day and night. At night, of course, the lamp on the platform is lighted to warn ships of shallow waters. Calshot Spit Light Vessel gives a white flash every five seconds. This is visible for ten miles and so can be seen by all vessels in the widening estuary where Southampton Water meets the Solent and Spithead.

A. T. Gill (Stanmore).

The Calshot Light Vessel. Photograph by A. T. Gill, Stanmore, Middlesex.

Fireside Fun

A tramp had called on a doctor for a check-up.
"Do you sleep well?" asked the doctor.
"Well," replied the tramp. "I sleep alright at night and in the morning, but in the afternoon I just seem to twist and turn the whole time."

* * * *

Joe: "Did you learn very much on your first day of school Jim?"
Jim: "Not enough, I suppose, I've got to go back tomorrow."

* * * *

"Is Macpherson a typical Scot?"
"I should say he is. He's saved all his toys for his second childhood."

* * * *

Sergeant (angrily to raw recruit): "Your hair, man! It should have been cut long ago."
Recruit (meekly): "It was."

* * * *

Tony: "What are you doing Antonio?"
Antonio: "I dig a ditch."
Tony: "What for?"
Antonio: "To make money."
Tony: "And what are you going to do with the money?"
Antonio: "Buy a good meal."
Tony: "But what are you going to do with the meal?"
Antonio: "I eat the meal to make muscle."
Tony: "But what do you want to make muscle for?"
Antonio: "To dig the ditch!"

* * * *

"Now we know that the Earth is round," said the schoolmaster. "Tell me Thomas—would it be possible for you to walk round the Earth?"
"No, sir!" replied Thomas.
"And why not?"
"'Cause I twisted my ankle playing football!"

* * * *

Jack "Did you hear the one about the bed?"
Mack: "No."
Jack: "No wonder. It hasn't been made up yet."

* * * *

"Oh mama, look at that silly man."
"Why, Betty, what is he doing?"
"He's sitting on the pavement talking to a banana peel."

* * * *

Jack: "Can you really run as fast as they say?"
Track Star: "Fast? Anybody who races against me has to run twice as fast as I do just to keep up."

* * * *

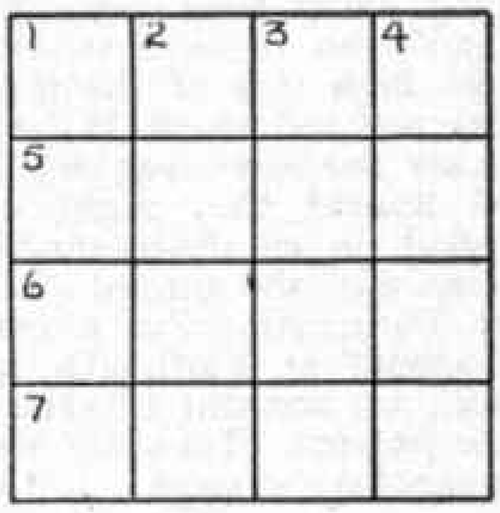
BRAIN TEASERS

PROFIT OR LOSS?

A car dealer informed a friend that he had just sold two cars for £990 each, and that on one car he had made a profit of 10 per cent., while on the other he had lost 10 per cent. His friend replied: "Then you are exactly where you were before you bought the cars!" Was this correct?

* * * *

"ALL BLANKS" CROSSWORD



Clues

Across

1. Edge or brink
5. To sit on
6. Kinds of beer
7. Soft or tender

Down

1. Cereal food for animals
2. To vex or make angry
3. Mentioned in "Julius Cæsar"
4. Engage

* * * *

WORD CHANGE

By taking a syllable from a word meaning "separated" leave a word meaning "passed away."

* * * *

WHAT AM I?

I am a shoe maker. I work without leather.
I have the four elements joined together,
Fire, water, earth and air,
And every customer wears two pairs.

* * * *

ANSWERS TO LAST MONTH'S PUZZLES

Geographical Quiz

The eleven letter word referred to in this puzzle is "Mississippi."

* * * *

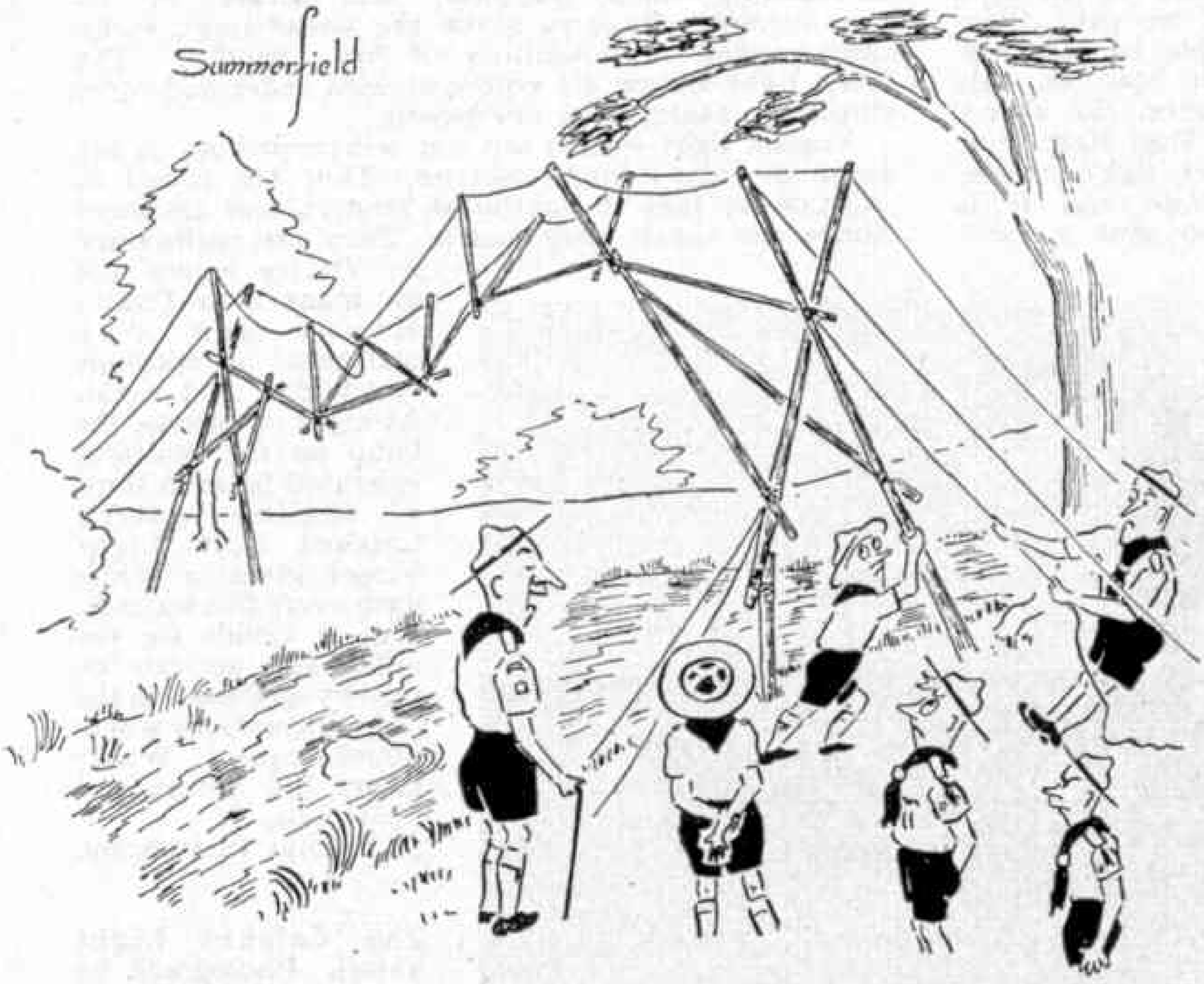
Radio Personalities

1. Edwards (Jimmy). 2. Jackson (Jack). 3. Harding (Gilbert). 4. Wisdom (Norman). 5. Dimbleby (Richard). 6. Andrews (Eamonn). 7. Robinson (Eric). 8. Cavanagh (Peter).

* * * *

Imprisoned Soldiers

The British prisoners were placed in cells 5, 7, 13 and 15. The Italians in 1, 4, 12 and 19; the French in 2, 9, 17 and 20; the Greeks in 3, 10, 11 and 18; and the Spanish in 6, 8, 14 and 16.



".... and when we've all crossed the bridge we'll do some first aid!"

Are YOU missing the boat?

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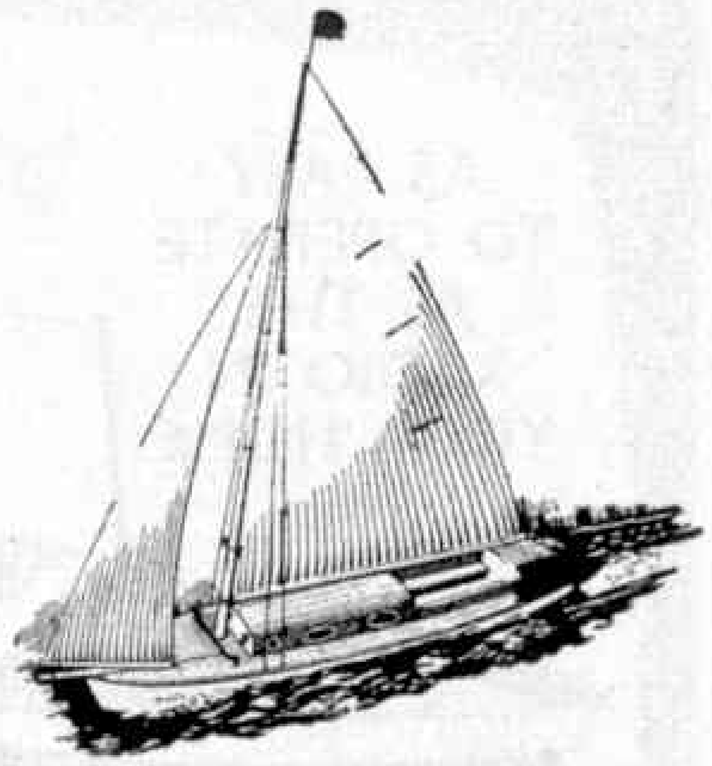
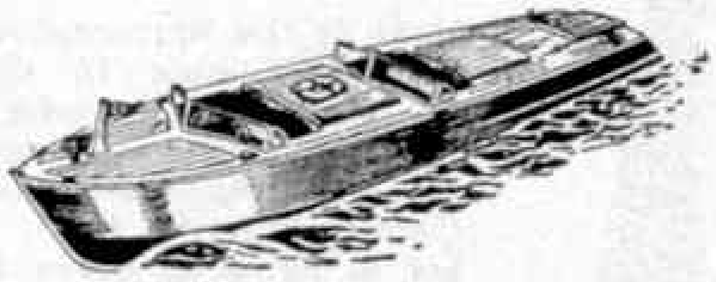


A GRAND SAILER
Model Yacht No. 3104. (all fittings included) **14/3**



A SPEEDY JOB
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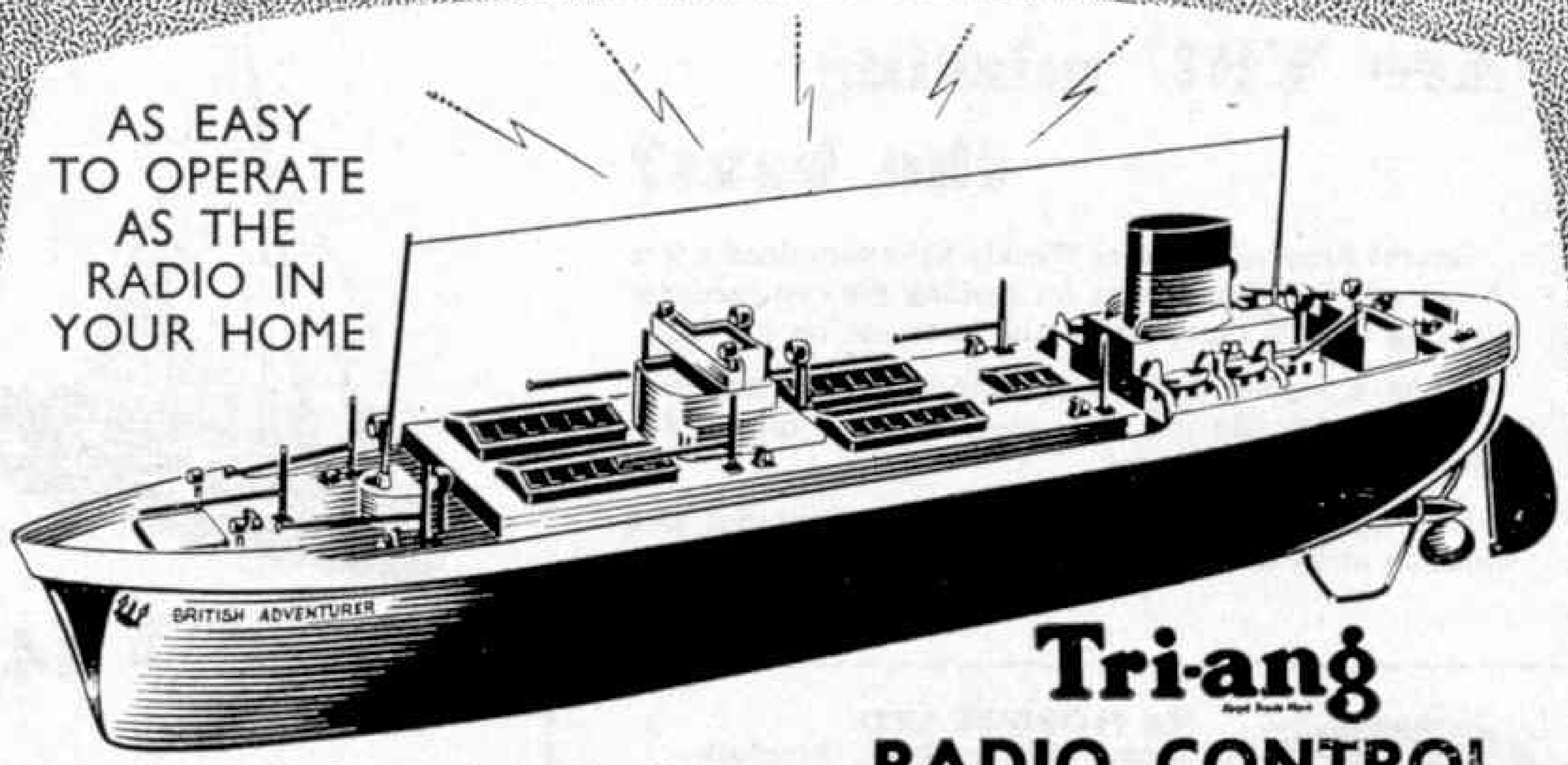

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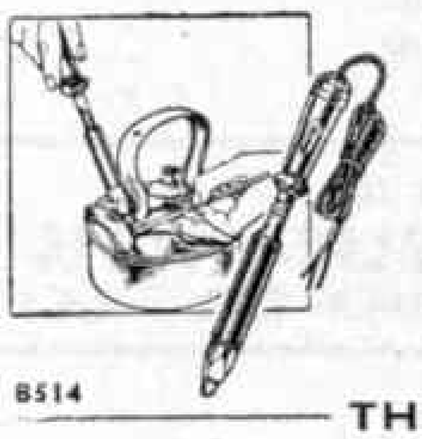

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3 *Can rubber tyres conduct electricity?*

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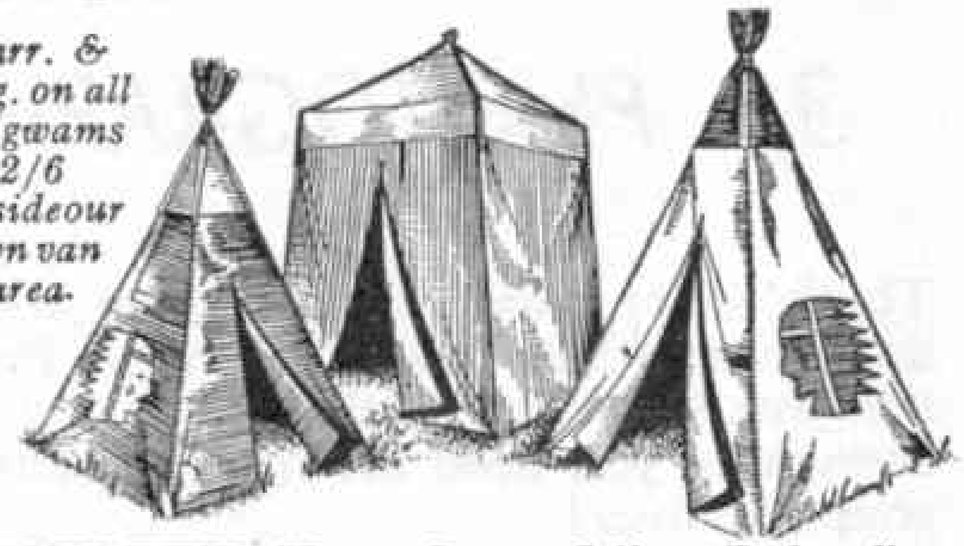

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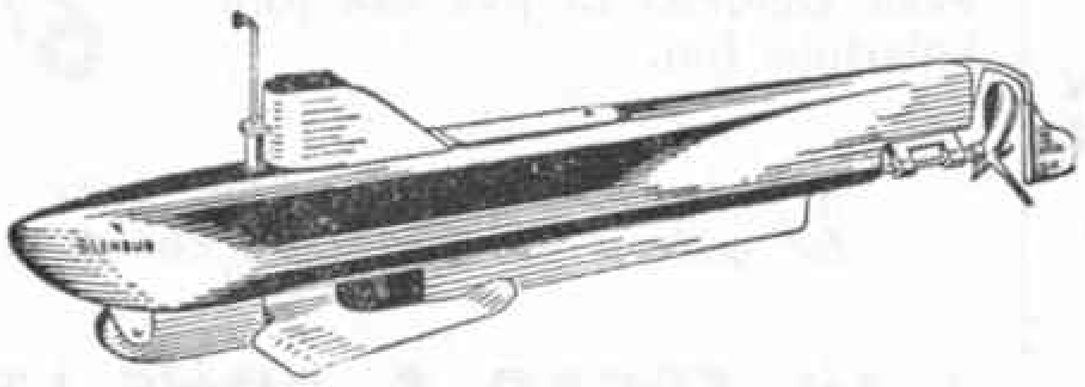

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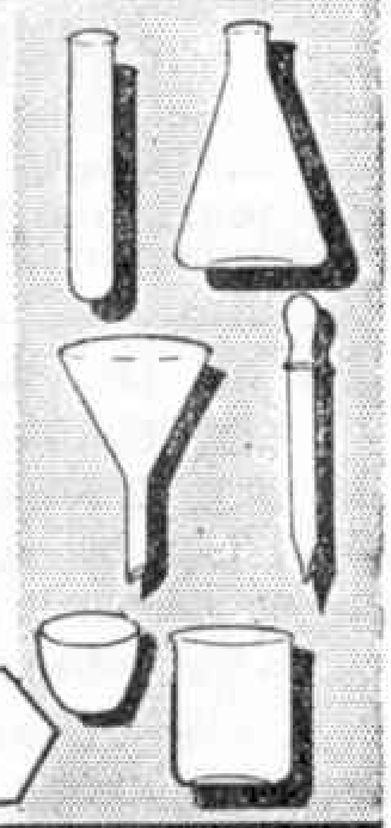

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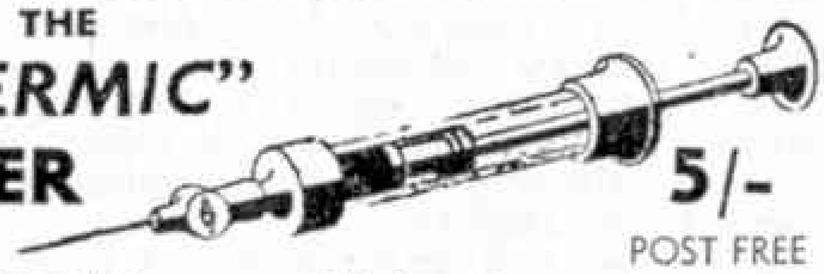

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At over 700 miles an hour flies the Hawker Hunter swept-back midwing single-seat day fighter powered by turbojet. You'll like the attractive little model of this new R.A.F. defensive arm in camouflage finish.

Length $2\frac{3}{4}$ in. Wing Span $2\frac{1}{8}$ in.

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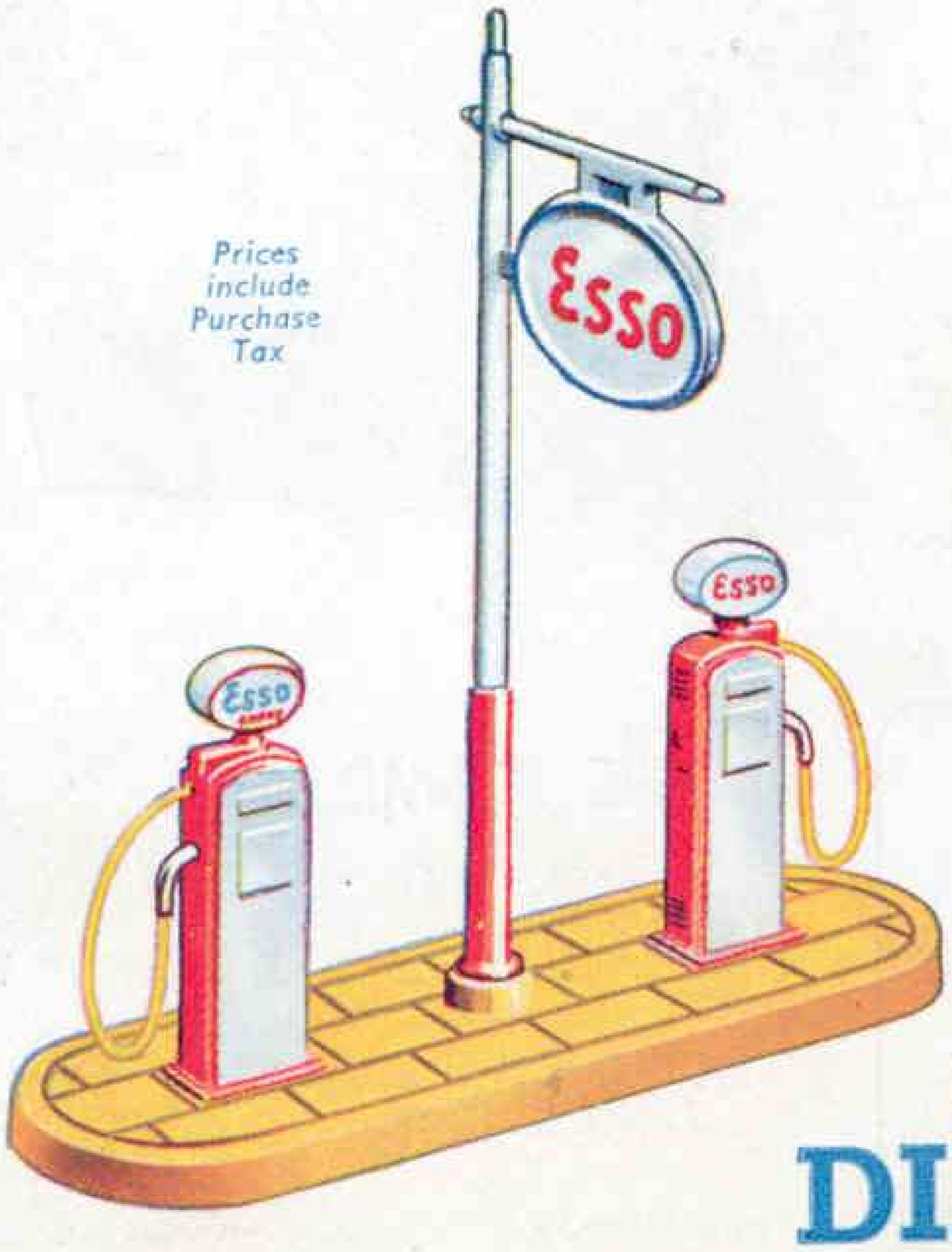

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